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December 26, 2011
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Federal Aviation Administration

U.S. Department of Transportation
Federal Aviation Administration
Technical Specification for

National Airspace System (NAS) Voice System (NVS)

Focal Point

Air Traffic Organization (ATO) - Technical Operations
Air Traffic Control (ATC) Communications Services
Voice Switching and Recording Team, AJW-924

Federal Aviation Administration
800 Independence Avenue SW
Washington, DC 20591

DISTRIBUTION STATEMENT: This specification is approved for use by all Departments of the Federal Aviation Administration (FAA).

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SECTION 1: INTRODUCTION

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1.0 INTRODUCTION

1.1 Scope

This specification contains the technical requirements of the Federal Aviation Administration (FAA) for the National Airspace System (NAS) Voice System (NVS). This specification cites Government and non-Government standards, orders, handbooks, and other pertinent documents to ensure the NVS will possess the necessary functional performance and interface requirements essential to the NAS.

1.2 Document Overview

Section 1 (this section) describes the scope of this specification, gives an overview of this specification, and gives an overview of the NVS. It is intended to be descriptive in nature and contains no binding requirements.

Section 2 lists the documents that are cited within subsequent sections as a part of binding requirements.

Section 3 lists system requirements, which includes references to Interface Requirements Documents (IRD) where applicable.

Section 4 contains verification requirements.

Section 5 lists Acronyms and Abbreviations.

Section 6 provides a Glossary.

The appendices consist of the Verification Requirements Traceability Matrix (VRTM).

1.3 System Overview

The NVS is comprised of three (3) fundamental elements, the Air Traffic Control (ATC) Voice Node (AVN), the Remote Radio Node (RRN) and the NVS Management System (NVSMS). FIGURE 1-1 shows the NVS Reference Architecture, with the NVS fundamental elements shaded in green.

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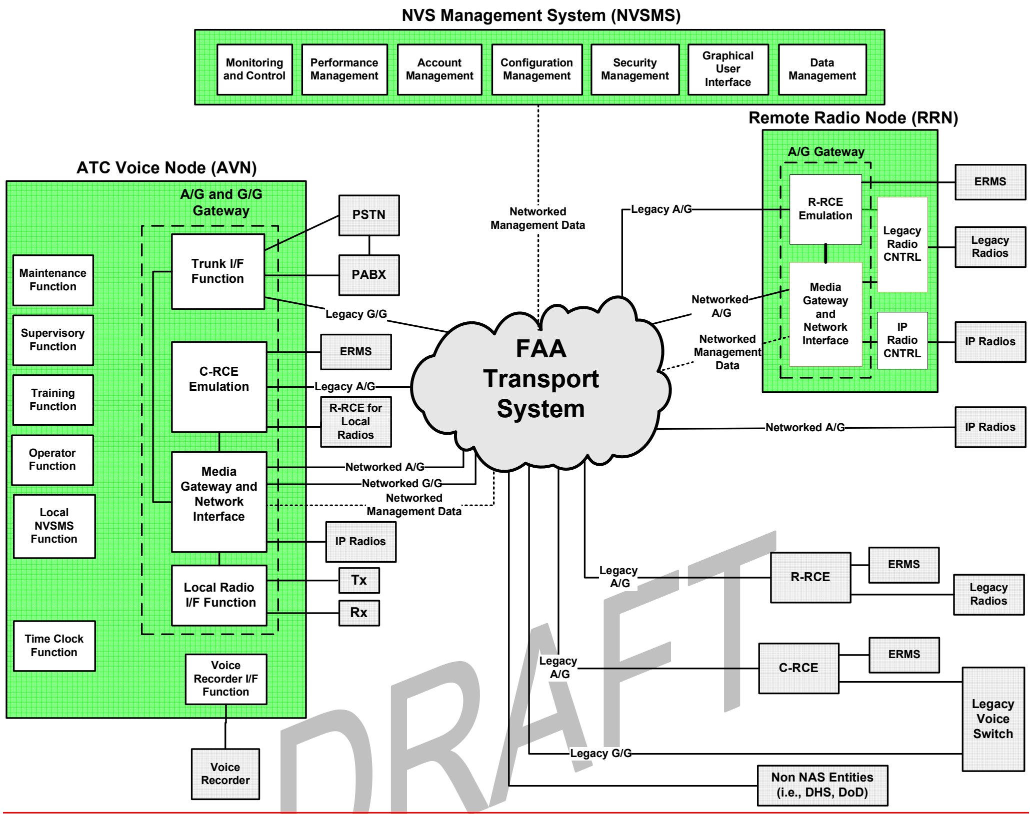

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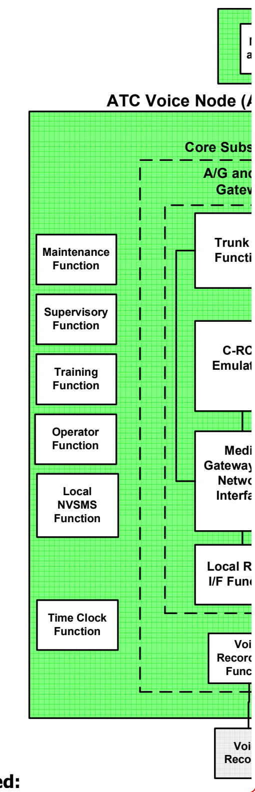

FIGURE 1-1. NVS Reference Architecture

The AVN requirements, as described herein, can be utilized in the Terminal, En Route and NextGen environments. The RRN can be deployed at Remote Communication Facilities (RCFs) to support Terminal, En Route, and NextGen environments. NVSMS is intended for use at all Air Traffic Control facilities and FAA Operation Centers.

Supporting the NVS, but excluded from the NVS procurement process, is the FAA Transport System. The NVS requirements to interface to the FAA Transport System are provided in Section 3 of this document as well as in the NVS to Government Provided Transport System Interface Requirements Document (IRD). References to Air-Ground radio equipment, voice recorders, legacy voice switches, and Radio Control Equipment (RCE) are also identified in FIGURE 1-1, Section 3 and their respective IRDs. These references are included to enhance the readers understanding of the FAA's vision for the NVS and illustrate existing subsystems' relationships and connectivity to the NVS fundamental elements. As shown in FIGURE 1-1, there are Legacy and Networked Air-to-Ground (A/G) and Ground-to-Ground (G/G) connections. Legacy A/G and G/G connections utilize traditional analog services are further

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defined in Section 3 of this document, the NVS to Analog Interphone IRD and the Radio Subsystems IRD. Networked A/G and G/G connections source requirements from EUROCAE Document (ED)-137 - Interoperability Standards for Voice over Internet Protocol (VoIP). Part 1 of ED-137, including FAA addendum items, defines the networked A/G requirements. Part 2 of ED-137, including FAA addendum items, defines the networked G/G requirements. In each case, it is required to utilize the services offered through the use of Session Initiation Protocol (SIP) in the establishment of virtual, VoIP voice connections across data transport services to the system end points. ED-137 and related FAA Addendums are part of the International Civil Aviation Organization (ICAO) 9896 document..

1.3.1 ATC Voice Node (AVN)

The Legacy G/G trunk interfaces supported by NVS are contained within the AVN and are required to fulfill the need for the node to interface with the legacy G/G telecom trunks, without the use of additional external interfacing equipment. The AVN is required to facilitate communications to numerous Air Navigation Service Providers (ANSP) with which the FAA has reciprocal agreements both domestically and internationally. A more complete listing of the types of trunks and the corresponding physical and logical interface requirements are outlined in the Analog Interphone IRD.

In order to perform requisite A/G and G/G operational duties, the Air Traffic Controller is provided with an array of functions at operator positions, which are a component of the AVN. It is envisioned that operator positions will be the human interface between an Air Traffic Controller and all other NVS capabilities and functions. Resource selection for A/G and G/G communications will be established using controls and functions accessible through the operator position, as well as audio routing, G/G conferencing and backup selection for A/G resources. Status displays are part of the operator position to enhance situational awareness for Air Traffic Controller and Air Traffic Supervisor personnel. Authorized personnel can facilitate execution of reconfigurations to adjust to air traffic demand.

In order to perform requisite configuration and maintenance duties, the Airway Transportation System Specialist (ATSS) personnel will also be provided with an array of local maintenance/monitoring functions. It is envisioned that the local maintenance/monitoring functions will permit the ATSS to interface and map the AVN and its operator positions to the desired configurations, herein called classmarks, to best serve air traffic operations. It will also facilitate authorized personnel to conduct preventative maintenance and troubleshoot the AVN when corrective maintenance is required.

The AVN will also collect formatted traffic data. This collection capability will also occur, without interruption or performance impact to the AVN. This traffic data, along with operator position and RRN status, will be the main source of information feeding the NVSMS. Provisions for collection of long term trend data are specified in Section 3.

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The AVN will utilize external interface connectivity to government furnished voice logging recorders to record all audio to and from each air ground radio link as well as each ground-ground circuit, and each operator position configured in the system. For the purpose of transmitting to-be-recorded audio to the legal recording equipment the AVN will utilize the requirements found in Section 3 of this document and the NVS to Voice Recorder IRD.

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1.3.2 Remote Radio Node (RRN)

The NVS Radio Subsystem capability or function will reside in both the AVN and RRN. The A/G radio functions contained in the AVN and RRN include the need to emulate all the legacy control-end and remote-end Radio Communications Equipment (RCE) functions. The AVN will include the necessary capabilities to directly interface with Legacy remote-end RCE or analog radio connections. The RRN will need to emulate a Legacy remote-end RCE and also support VoIP, SIP and ED-137 and related FAA Addendum.

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Both the AVN and RRN will provide the following capability:

- Activation of connected radio equipment for transmission by passing through push to talk signaling and other control signals to the connected radio equipment
- Various indicators and controls to facilitate maintenance operation
- Control capability in order to switch between main and standby equipment

Detailed descriptions of each Radio Subsystem function and requirements are contained in Section 3 and the Radio Subsystem IRD.

1.3.3 NVS Management System (NVSMS)

The NVSMS requires functionality to seamlessly support ATC operations performed at local and aggregate levels. At the local level, NVSMS will provide similar voice communications monitoring and control functions required by FAA authorized personnel at Air Traffic Control (ATC) Facilities. NVSMS also supports data collection from multiple ATC facilities, and permits monitoring and control at an aggregate level. Data from multiple ATC Facilities can be used to promote situational awareness to a multitude of authorized users. Aggregate level NVSMS users are envisioned to be primarily collocated at FAA operations facilities, but authorized personnel will be able to perform role based functions, regardless of their physical location. As NVSMS cultivates situational awareness beyond the traditional ATC monitoring and control functions of legacy voice communications systems, the NAS will begin to benefit from voice enterprise capabilities, which support the objectives listed above.

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NVSMS authorized personnel may be local to AVN facilities {e.g. TRACONs, ARTCCs, Service Operations Center (SOCs)} or may be located in other NAS facilities {e.g. Operations Control Center (OCCs), Network Enterprise Management Center (NEMC) or National Operations Control Center (NOCC)}. NVSMS authorized personnel will have role-based permissions allowing them to perform their specific duties (e.g. Second Level Engineering, Security, SOC, OCC, NEMC or NOCC) using a “portal” or Graphic/Web User Interface (GUI/WUI). The NVSMS will allow equipment health, network performance, and traffic information to be shared between the NVS and other systems, via widely accepted protocols.

The NVSMS will include functionality to manage user account creation and maintenance functions including assigning rights to individuals as well as the ability to reset user identification and passwords. Systems configuration data will be maintained as part of the NVSMS through the provision of offline data base creation and validation.

The NVSMS will provide monitoring of real-time system status and control of all fundamental elements including: the AVNs, RRNs and legacy RCE units. Real time status updates are expected to be provided to authorized personnel in order to receive results from Line Replaceable Unit (LRUs). Logging of failure of equipment or subsystems will be supported and made available to authorized personnel to aid in troubleshooting and continuous improvement programs

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Operational logs are generated and maintained to document all system states and the events including those that negatively impact the functionality of the NVS fundamental elements LRUs. Alarms provided in the case of failure conditions and are logged locally, as well as, at centralized NVSMS locations. All logs will be time-stamped for event recording and security purposes.

Faults of the NVS fundamental elements are monitored continuously with Built In Test Equipment (BITE). Proper software and hardware operation are monitored from power up to fully loaded operational conditions using BITE and other diagnostic applications. Exceptions or failures are also time-stamped locally and are envisioned to be accessible to authorized personnel via NVSMS regardless of location.

Alarms are generated based on the result of BITE, authorized personnel initiated performance test, or event driven alarms. Reporting and alarming capability is critical to the operation of NVSMS for maintenance and configuration management tasks. Network performance will be characterized within the NVSMS and reported in a number of ways to alert personnel to any performance degradation throughout the NVS elements, either locally to a particular AVN, or across multiple ATC facilities between any number of installed AVNs or RRNs.

The NVSMS will need to be protected with different levels of security, in compliance with a defense in depth strategy, applicable to all fundamental elements of NVS. Detailed security requirements will be derived from several high level directives from numerous Government agencies in an effort to protect sensitive data and the overall integrity of operations of the NVS. User access provisions will be role based and restricted to those functions required for normal operations for authorized personnel roles.

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SECTION 2: APPLICABLE DOCUMENTS

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2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In case of any discrepancy between these documents and specific requirements of this specification, this specification must be considered the superseding document unless otherwise directed by the government.

Copies of government documents may be obtained as directed by the contracting officer.

Copies of non-government documents are generally available in technical libraries or may be obtained from their originators.

When the requirements of this document and referenced applicable documents are in conflict, this document must have precedence over all documents referenced herein.

If either two or more referenced applicable documents are in conflict or two or more sections of this document are in conflict, the NVS program office must be notified to resolve the conflict.

2.1 <u>Government Documents</u>

2.1.1 <u>Specifications</u>

FAA-C-1217F; Electrical Work, Interior (February 26, 1996)

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FAA-D-2494B Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books (March 14, 1984)

FAA-ER-130-005I, Advanced Automation System Level Specification (June 9,1993)

FAA-G-2100H; Electronic Equipment, General Requirements (May 9, 2005)

MIL-PRF-22885G; Switches, Push Button, Illuminated, General Specification For (Jan 21, 2005)

MIL-L-85762A: Lighting, Aircraft, Interior, Night Vision Imaging System (NVIS) Compatible (August 26, 1988).

MIL-L-85762A: Lighting, Aircraft, Interior, Night Vision Imaging System (NVIS) Compatible (August 26, 1988).

NAS-MD-793A; Remote Maintenance Monitoring Requirements (RMMS); Functional Requirements for the Remote Monitoring Subsystem (July 31, 1995).

2.1.2 Standards

a. DOT/FAA/CT-03/05 HF-STD-001, Human Factors Design Standard for Acquisition of Commercial Off-the-Shelf Subsystems, Non Developmental Items, and Development Systems (May, 2003)

b. FAA HF-STD-004; Requirements for a Human Factors Program (June 1, 2009)

c. FAA-STD-016a; Quality Control System Requirements (September 21, 1987)

d. FAA-STD-018a; Computer Program Quality Program Requirements (September 30, 1987)

e. FAA-STD-019e; Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment (December 22, 2005)

f. FAA-STD-021a; Content and Format Requirements for the Preparation of Test and Evaluation Documentation (September 30, 1987)

g. FAA-STD-026a; Software Development for the National Airspace System (NAS) (June 1, 2001)

h. FAA-STD-028c, Contract Training Programs (November 16, 2000)

i. FAA-STD-067, Preparation of Specifications (December 4, 2009)

j. MIL-STD-461F, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment (December 10, 2007).

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t. NAS-IRD-nnnnnnnn, National Airspace System (NAS) Voice System (NVS) to Analog Interphone Interface Requirements Document (IRD)

u. NAS-IRD-nnnnnnnn, National Airspace System (NAS) Voice System (NVS) to Power Interface Requirements Document (IRD)

v. NAS-IRD-nnnnnnnn, National Airspace System (NAS) Voice System (NVS) to Radio Subsystem Interface Requirements Document (IRD)

w. NAS-IRD-nnnnnnnn, National Airspace System (NAS) Voice System (NVS) to Voice Recorder Interface Requirements Document (IRD)

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b. Title 29 CFR 1926, Occupational Safety and Health Administration, Labor.

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2.1.5 Other Federal Documents

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<#>Public Law 107-347 (E-Government Act of 2002) Title III, Federal Information Security Management Act (FISMA) of 2002 (December 17, 2002).¶

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SECTION 3: REQUIREMENTS

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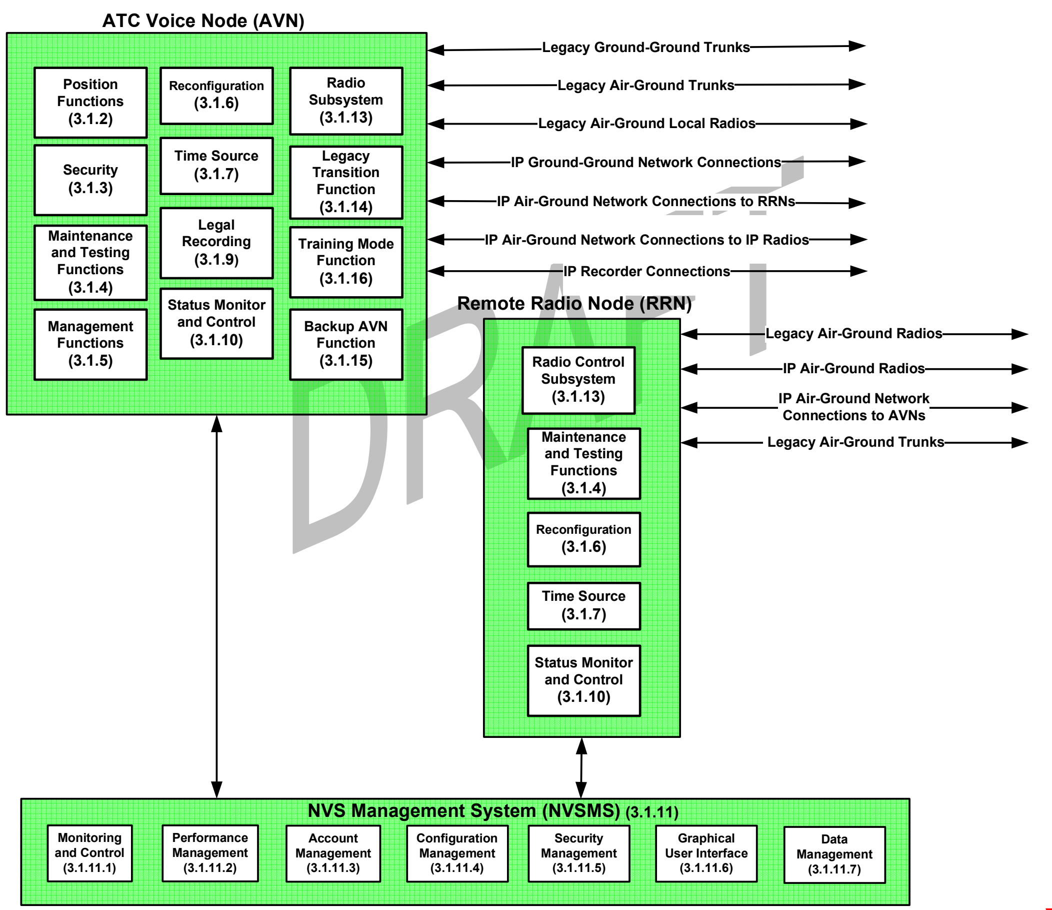
3.0 REQUIREMENTS

A simplified functional representation of the NVS is shown in FIGURE 3-1. The figure shows the NVS decomposed to its functional elements and its interfaces to external systems. Functionally the NVS is represented by three (3) fundamental elements: 1) ATC Voice Node (AVN); 2) Remote Radio Node (RRN); and 3) NVS Management System (NVSMS). Within the NVS functional elements are cross references to the corresponding section numbers within this section.



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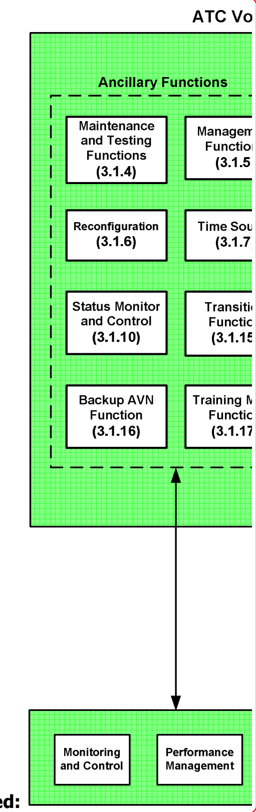

FIGURE 3-1. Functional Block Diagram of the NVS

3.1 Core Functional Requirements

This section provides the core system functional requirements of the NVS.

a. The NVS must, when connected via a network interface, permit any position operator to access any A/G resource physically connected to any AVN or RRN to establish the requested A/G communication.

b. The NVS must, when connected via a network interface, permit any position operator to access any G/G resource physically connected to any AVN to establish the requested G/G communication.

c. The NVS must provide a gateway function that permits translation between any legacy interface to a networked NVS interface.

d. The NVS must, when connected via a selective dial legacy interface, permit any NVS position operator to access identical selective dial legacy resources physically connected to any AVN to establish the requested G/G communication.

e. The NVS must, when connected via a selective dial legacy interface, permit any legacy position operator to access identical selective dial legacy resources physically connected to any AVN to establish the requested G/G communication.

f. The NVS must prohibit unexpected or false operation at any position, due to procedures performed at any other position.

g. The NVS must prohibit unexpected or false operation at any radio interface due to procedures performed at any other radio interface.

h. The NVS must prohibit unexpected or false operation at any trunk interface due to procedures performed at any other trunk interface.

i. The NVS must permit simultaneous operation of all operational positions.

3.1.1 Equipment Types

3.1.1.1 Operational Position

a. The AVN must provide operational positions for air traffic controllers and specialists. The number, location and configuration of such positions will be

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identified at time of order, subject to the system sizing and capacity requirements identified in section 3.5.2.

b. The AVN must provide positions that permit the operator access to position controls.

c. The AVN must provide positions that permit access to A/G communications functions, as defined by classmarks.

d. The AVN must provide positions that permit access to G/G communications functions, as defined by classmarks.

e. The AVN must provide positions that permit access to call features as defined by classmarks.

3.1.1.2 Workstations

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a. The NVS must provide a workstation(s) for access and control of NVS configuration.

b. The NVS must provide a workstation(s) for viewing NVS status.

c. The NVS must ensure that the workstation functions are independent of the operational position equipment.

d. The NVS must assert the functional capabilities of a workstation(s) based on the user's log-on credentials.

3.1.2 Position Functions

3.1.2.1 A/G Communications Functions

3.1.2.1.1 Frequency Add and Delete

a. The AVN must permit operators, as authorized, to add frequencies to their position up to the physical limit of available frequency selectors at the operator position.

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b. The AVN must permit operators, as authorized, to delete frequencies from their position.

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c. The AVN must prohibit the frequency add and delete operations to affect operations at other operator positions.

d. The AVN must maintain frequency assignments for each operator position.

3.1.2.1.2 A/G Communications Error

a. The AVN must, when A/G function is lost for more than 200 ms at the operator position, acknowledge the failure by the loss of sidetone and flutter.

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3.1.2.1.3 Transmit Controls

3.1.2.1.3.1 Select/Deselect Transmitter

a. The AVN must permit the selection of the transmitter associated with the frequency, independently of the receiver for each frequency classmarked as latching at the operator position.

b. The AVN must permit the selection of a transmitter at any operator position, without affecting the state of that assigned transmitter at other operator positions, except for multiple site groups.

c. The AVN must permit the deselection of the transmitter associated with the frequency, independently of the receiver for each frequency classmarked as latching at the operator position.

d. The AVN must permit the deselection of a transmitter at any operator position without affecting the state of that assigned transmitter at other operator positions, except for multiple site groups.

e. The AVN must permit transmitter selection at any operator position to be accomplished with a single touch action of a latching selector.

f. The AVN must permit transmitter deselection at any operator position to be accomplished with a single touch action of a latching selector.

g. The AVN must provide push-to-talk (PTT) commands from the initiating position to the selected on-line (either main or standby) frequency transmitter interface, after the selection of a transmitter.

h. The AVN must, when a transmitter is deselected at the position, prohibit PTT commands from that position to the deselected transmitter interface.

i. The AVN must prohibit the deselection of a transmitter at any operator position to affect incoming A/G audio from any selected receiver.

j. The AVN must, when a transmitter is deselected at the position, prohibit voice from that position to the deselected transmitter interface.

k. The AVN must permit the deselection of the transmitter at an operator position, but not the receiver, for a selected frequency without causing the deselection of the frequency at the position.

l. The AVN must deselect the frequency at an operator position when both transmitter and the receiver for a selected frequency at a position are deselected.

m. The AVN must prohibit the disabling of transmission for any frequency at any operator position from affecting transmission on that frequency at any other position.

n. The AVN must permit the enabling of the transmission of voice from an operator position for any selected frequency.

o. The AVN must permit the disabling of the transmission of voice from an operator position for any selected frequency.

p. The AVN must allow at each operator position the selection, in any combination, of the non-latching frequency transmitters assigned to the position, up to the maximum number of latching frequency transmitters assigned to the position.

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3.1.2.1.3.2 M/S Transceiver Selection Method

a. The AVN must provide M/S transceiver selection at any operator position for facilities with access to tunable transceivers. Tuning will be accomplished external to the NVS.

b. The AVN must permit an assigned radio frequency to be selected by a single touch action at any operator position, as controlled by classmark.

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c. The AVN must permit an assigned radio frequency to be deselected by a single touch action at any operator position, as controlled by classmark.

d. The AVN must provide access at any operator position to tunable ECS transceivers, via the appropriate ECS system.

3.1.2.1.3.3 Main/Standby (M/S) Transmitter Transfer

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a. The AVN must permit the operator to transfer between main and standby transmitters at each operator position for each frequency with main/standby transmitter assigned to the operator position.

b. The AVN must permit selection of M/S transmitters at each operator position independently of the receivers as configured by classmark

c. The AVN must permit deselection of M/S transmitters at each operator position independently of the receivers as configured by classmark.

d. The AVN must, for each assigned frequency at the operator position, provide a continuous visual indication of the M/S transmitter state.

e. The AVN must, for frequencies not having standby equipment, prohibit the operation of the M/S function at the operator position from having any effect on the transmitter state.

f. The AVN must make M/S selection for a given transmitter at any operator position become the setting for all positions where the radio is assigned.

g. The AVN must ensure the assignment of main or standby transmitter for a selected frequency requires no more than two touch actions.

h. The AVN must, if one touch is used, permit transmitter main/standby transfer to be initiated via a single touch action of an assigned latching toggle selector.

i. The AVN must, if two touches are used, permit the position operator to apply one touch to a main/standby function touch area, and a second touch to the transmitter touch area of a selected frequency to enable selection of main or standby transmitter.

j. The AVN must ensure that the selected M/S transmitter state is in effect at all positions to which the frequency is assigned.

k. The AVN must permit M/S transmitter transfer only by classmarked position(s).

l. The AVN must, for transmitters with active PTT, prohibit M/S transfer.

m. The AVN must prohibit M/S transmitter selection for frequencies that are using BUEC.

n. The NVS must, upon detection of a change from main to standby transmitter (or vice versa), provide an indication that reflects that change at all operator positions to which the affected frequency is assigned.

o. The AVN must establish the M/S selection status at the operator position to be in agreement with the current radio interface state.

3.1.2.1.3.4 Air to Ground (A/G) PTT Activation

a. The AVN must provide PTT activation signaling to any of the selected main or standby transmitter(s), whichever are online, except frequencies classmarked as non-latching, whenever a PTT device is active at any operator position.

b. The AVN must, as controlled by frequency classmark, accept PTT confirmation signal from radio interfaces that do provide PTT confirmation.

c. The AVN must, as controlled by position classmark, provide a continuous distinct visual indication of the presence of PTT confirmation on every assigned frequency at an operational position whether or not the frequency has been selected for use at the operator position.

d. The AVN must, as controlled by position classmark, provide a continuous distinct visual indication of the presence of PTT confirmation on every assigned frequency at an operational position only on frequency(ies) that have been selected for use at the position.

e. The AVN must connect the operator microphone audio at the transmitting position to the selected transmitters (except frequencies classmarked as non-latching); whenever a PTT device is active at the operator position.

f. The AVN must, whenever a PTT device is active at the operator position (except for multiple site group and paired radios), ensure that incoming A/G audio is not affected from frequencies having receiver(s) selected but transmitter(s) not selected.

g. The AVN must, when PTT is active on a frequency, prohibit any operator from changing the M/S state of the transmitter for that frequency.

h. The AVN must prohibit the deselection of a transmitter while PTT is active on that transmitter at the transmitting position.

i. The AVN must permit concurrent transmissions on all frequencies assigned to the operator position.

j. The AVN must resolve simultaneous PTT actuations for a frequency transmitter by any positions such that only one operator position is connected to a frequency transmitter and all other operator positions are locked out.

3.1.2.1.3.5 A/G PTT Operation

3.1.2.1.3.5.1 A/G PTT Lockout Conditions

a. The AVN must, whenever any operator not having preemption capability attempts to transmit on radios that are already in use by any other operator, follow PTT lock-out rules on the affected radios.

b. The AVN must, whenever any operator not having preemption capability attempts to transmit on paired radios that are already in use by any other operator, follow PTT lock-out rules on the affected radios.

c. The AVN must, whenever any operator not having preemption capability attempts to transmit on multiple site group(s) that are already in use by any other operator, follow PTT lock-out rules on the affected radios.

d. The AVN must follow PTT lock-out rules on the affected radios at any operator position attempting PTT of a radio interface that is receiving a PTT Trunk Lockout signal.

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3.1.2.1.3.5.2 A/G PTT Lockout Rules

a. The AVN must, whenever a lock-out condition is present at any operator position, prohibit the PTT attempt on the affected radio(s) from that operator position.

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b. The AVN must provide distinct visual indication of PTT lockout to the locked-out operator for the duration of the lockout.

c. The AVN must provide distinct audible indication of PTT lockout to the locked-out operator for the duration of the lockout.

d. The AVN must ensure that the audible PTT lockout indication does not interfere with communications in progress at the operator position.

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e. The AVN must, as configured by position classmark, supply the PTT lockout audible indication to the A/G loudspeaker (LS) for the duration of the PTT lockout on that radio.

f. The AVN must, as configured by position classmark, supply the PTT lockout audible indication to the headset (HS) for the duration of the PTT lockout on that radio.

g. The AVN must provide a textual message indicating which radio(s) are locked out at the locked-out operator position.

h. The AVN must display the textual message indicating which radio(s) are locked out for three seconds, unless overwritten by subsequent messages.

i. The AVN must display the textual message for up to four locked-out radios, unless overwritten by subsequent messages.

j. The AVN must terminate the lockout upon release of PTT by all but the last operator or removal of externally provided PTT Lock Out signal.

k. The AVN must, when the lock-out condition is resolved, permit the operator position still attempting to PTT to acquire transmitter ,without requiring this operator to release and reactivate PTT.

l. The AVN must permit radios that do not have PTT lockout asserted to continue to operate normally.

m. The AVN must, when two radios are configured to operate with a single trunk and a PTT signal is activated on one of the two radios, lock out both radios to PTT at all other operator positions with those radios selected.

n. The AVN must, when a paired radio is configured to operate with a single trunk and both of the paired radios are keyed, apply PTT lock-out rules on both keyed radios.

o. The AVN must apply PTT lockout requirements for those configurations where multiple operator positions have access to a given assigned radio through a single radio interface.

p. The AVN must exclude PTT lockout requirements when a radio is assigned at multiple operator positions where access to the radio is through separate radio interfaces.

3.1.2.1.3.6 Non-Latching Frequency Transmitter Activation

a. The AVN must provide a means to classmark each frequency to have non-latching transmitter activation.

b. The AVN must, for each selector assigned to an operator position to access a non-latching frequency transmitter, provide a unique and continuous visual indication of non-latching classmark on the selector.

c. The AVN must provide the means to classmark each non-latching frequency as an emergency frequency.

d. The AVN must permit the operator to initiate transmission on a non-latching frequency with a continuous single touch action of the appropriate non-latching frequency transmitter selector.

e. The AVN must ensure that Emergency frequencies are uniquely marked on operator position interactive displays.

f. The AVN must provide PTT and perform related actions in accordance with 3.1.2.1.3.3 whenever the transmitter selector is activated on a non-latching frequency.

g. The AVN must permit operator transmission on frequencies classmarked as non-latching without the activation of a physical PTT device at the operator position.

h. The AVN must terminate transmission on the frequency and associated lockouts, upon release of the non-latching frequency transmitter selector.

i. The AVN must prohibit the selection of a non-latching frequency transmitter from causing the activation of PTT on any other frequency as controlled by classmark.

j. The AVN must permit simultaneous use of non-latching and normal transmitters (i.e., by simultaneous activation of non-latching transmitter selector and use of PTT device) as controlled by classmark.

k. The AVN must require the monitor jack to use the HS PTT to preempt operator audio on any non-latching frequency, which will also key all radios selected for transmission at that position.

3.1.2.1.3.7 Emergency Frequency Transmit/Receive All

a. The AVN must provide an Emergency Frequency Transmit-All non-latching selector at each position as configured by authorized personnel.

b. The AVN must upon activation of the Emergency Frequency Transmit-All selector, activate all classmarked non-latching emergency frequency transmitters configured at an operator position as controlled by classmark.

c. The AVN must transmit voice from the position over the selected emergency frequency (frequencies) and over all other frequencies at the operator position that are selected and have transmitters enabled, for the duration of the operator touch, as controlled by classmark.

d. The AVN must provide a visual indication to every operator position operator with emergency frequency assignments to notify the operator of the activation of an emergency frequency transmitter.

e. The AVN must, upon release of the non-latching Emergency Frequency Transmit-all selector, terminate transmission on all emergency frequencies.

f. The AVN must permit simultaneous transmission on emergency and non-emergency transmitters when a non-latching transmitter selector is activated and a PTT device is engaged with transmitter enabled at the operator position.

g. The AVN must, as classmarked, require the monitor jack at the same operator position to use the HS PTT to preempt operator audio on any non-latching frequency, which will also key all radios selected for transmission at that position.

h. The AVN must provide each operator position, that has A/G capabilities, access to the UHF and VHF emergency frequencies as configured by authorized personnel.

i. The AVN must provide connectivity to the radio interfaces for the emergency frequency transmitters and receivers from all operator positions that have the emergency frequencies assigned.

j. The AVN must allow each position operator to disable, in any order, all but one assigned VHF and all but one assigned UHF emergency frequency transmitter, unless otherwise classmarked.

k. The AVN must, if emergency frequencies are assigned to any operational positions within a supervisor's responsibility, provide that supervisor an alarm indication when any of the emergency receivers are not being monitored by at least one operational position.

l. The AVN must allow the receipt of the emergency frequency not monitored alarm indication to be configurable on a per frequency basis.

m. The AVN must allow each operator position to locally mute or enable reception of voice at the position, for all assigned emergency frequencies, unless otherwise classmarked.

3.1.2.1.3.8 Multiple Sites for a Frequency

a. The AVN must permit a given assigned frequency at an appropriately classmarked operator position, to access multiple remote transmitter/receiver/transceiver sites for that frequency through multiple radio interfaces.

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b. The AVN must ensure that the transmitter site selected by any classmarked position is displayed as enabled at all operator positions with the transmitter enabled or attempting to enable any transmitter for the frequency.

c. The AVN must provide controls such that only one of the transmitters for the frequency is enabled at a time for all operator positions having that frequency.

d. The AVN must ensure that a single touch action to a transmitter disables the previously enabled transmitter and enables the selected transmitter.

e. The AVN must, for deselected frequency/sites in a multiple site group, ensure the selection of a deselected noncurrent site causes the enabling of the main or standby receiver only.

f. The AVN must require a touch to the disabled transmitter button to enable the current site transmitter, and disable the transmitter of the previously selected site if the operator position is classmarked for site selection.

g. The AVN must, upon the selection of a deselected current site, enable both the transmitter and receiver with a single touch.

h. The AVN must support a minimum of 6 sites per frequency site group.

i. The AVN must permit the definition of up to 400 multiple site groups.

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j. The AVN must provide a voting algorithm that utilizes Receiver Signal Strength Indication (RSSI) to select the best voice signal from the enabled receivers on the same frequency in a multi-site group.

k. The AVN must provide a voting algorithm that utilizes Automatic Gain Control (AGC) voltage to select the best voice signal from the enabled receivers on the same frequency in a multi-site group.

l. The AVN must provide a signal quality analysis voting algorithm, without the use of receiver signal strength information, to select the best voice signal from the enabled receivers on the same frequency in a multi-site group.

m. The AVN must provide a voting algorithm that utilizes any combination of receiver RSSI, receiver AGC voltage and signal quality analysis (without receiver signal strength information) to select the best voice signal from the enabled receivers on the same frequency in a multi-site group.

n. The AVN must allow operators to manually toggle the voting algorithm ON and OFF.

o. The AVN must allow operators to select/deselect the audio present at any receiver within the group when voting is disabled.

p. The AVN must, when the voting algorithm has been manually disabled, prohibit signal voting until the voting algorithm is manually enabled.

q. The AVN must provide a visual indication of the selected state (voting algorithm enabled or disabled) by diversity group at all affected operational positions.

r. The AVN must cause the present audio from the second receiver to be directed to the operational position(s) when reception from the voted receiver has ended, without the need for additional PTT keying from the second transmitter (aircraft).

s. The AVN must provide a visual indication of squelch break at the operational position(s) for all receivers that pick up the audio signal, regardless of the state of the voting algorithm.

3.1.2.1.3.8.1 PTT Receiver Muting of Multiple Sites

a. The AVN must, when PTT is active at the radio interface for any site, for a frequency configured for multiple sites, completely mute the received voice at the interfaces for all sites for the frequency; including any sites selected for BUEC.

b. The AVN must, when a satellite radio interface is used for transmission within a multiple site group, automatically provide a configurable receiver mute delay.

c. The AVN must provide a configurable receiver mute delay of 0 to 1 second in 50ms increments.

3.1.2.1.3.8.2 A/G PTT Carry Over

a. The AVN must, once a PTT has been established for an A/G call, permit the selection of a new transmitter site, within a multiple site group without releasing PTT.

b. The AVN must, upon selection of a new transmitter site within a multiple site group, transmit the operator's voice over the newly selected site and all other A/G frequencies with transmitters enabled at the position.

3.1.2.1.3.8.3 Site Group Maintenance

a. The AVN must provide access to the site group maintenance capability.

b. The AVN must permit a position having site group(s) assigned to be configured to enable and disable the site group maintenance capability.

c. The AVN must permit a position operator to activate the frequency site group maintenance selection function with a single touch action.

d. The AVN must provide a visual indication that the site group maintenance selection function is enabled.

e. The AVN must permit a subsequent touch action to a displayed frequency site to designate the frequency site as selected for site group maintenance.

f. The AVN must automatically disable the site group maintenance selection function if no frequency site selection is made within 15 seconds after the site group maintenance function is enabled.

g. The AVN must ensure that the selection of a frequency site for site group maintenance removes the frequency from the site group.

h. The AVN must ensure that the selection of a frequency site for site group maintenance removes the frequency from the diversity algorithm (if enabled) for the multiple site groups.

i. The AVN must provide a continuous visual indication to all affected positions when a frequency site that is part of a multiple site group is placed in site group maintenance mode.

j. The AVN must ensure that placing one or more frequency sites in site group maintenance mode does not affect the operation of the any other frequency site or site group.

k. The AVN must permit the site group maintenance for a frequency site to be deselected by enabling the selection function and a subsequent touch action to a displayed frequency site with frequency site group maintenance selected.

l. The AVN must, when the frequency site(s) is taken out of site group maintenance mode, remove the visual indication from the frequency site(s) at all affected positions.

m. The AVN must, permit any site within a site group to be placed in site group maintenance mode.

n. The AVN must ensure that when a frequency site is taken out of site group maintenance mode, that frequency site(s) is automatically placed back into the multiple site groups.

o. The AVN must ensure that when a frequency site is taken out of site group maintenance mode, that frequency site(s) is automatically placed back into the diversity algorithm for the multiple site groups.

3.1.2.1.3.9 Paired Frequencies

a. The AVN must provide access to the paired frequency function.

b. The AVN must, when the paired frequency feature is enabled, ensure that both transmitters of the pair are enabled when either of the two transmitters is enabled at the position.

c. The AVN must, for paired frequencies, provide a radio classmark (Selective Mode Transmitter Tracking) that when enabled; allows any operational position that has the pair assigned to enable both transmitters of the pair, when either of the transmitters is selected.

d. The AVN must, when two frequencies are in the paired mode and a PTT signal is activated on one of the two frequencies, ensure that both frequencies are locked out to PTT at all other positions with those frequencies selected.

e. The AVN must, when the paired frequency feature is enabled at a position, ensure that both receivers of the pair are enabled when either of the two receivers is enabled at the position.

f. The AVN must, when the paired frequency feature is enabled at a position, ensure that both receivers of the pair are disabled when either of the two receivers is disabled at the position.

3.1.2.1.3.10 Backup Emergency Communication (BUEC) and Emergency Communications System (ECS)

a. The AVN must recognize a request for a BUEC/ECS frequency access from a position that has the frequency selected and BUEC/ECS access permitted.

b. The AVN must, when BUEC/ECS is selected at a position, retain the previous RX and TX state(s) of the radio.

c. The AVN must disable PTT to the radio interface for the frequency for which BUEC/ECS is selected.

d. The AVN must, while BUEC/ECS is selected for a frequency, enable voice and signaling to the assigned BUEC/ECS access port from all positions with the frequency selected.

e. The AVN must, while a BUEC/ECS select is active for a frequency, store the operational configuration of the original radio interface selections.

3.1.2.1.4 Receive Controls

3.1.2.1.4.1 Select/Deselect Receivers

a. The AVN must, for each frequency at each operator position, permit the operator to select the receiver associated with the frequency.

b. The AVN must, for each frequency at each operator position, permit the operator to deselect the receiver associated with the frequency.

c. The AVN must permit selection of a receiver at each operator position to be accomplished with a single touch action of a latching selector.

d. The AVN must permit deselection of a receiver at each position to be accomplished with a single touch action of a latching selector.

e. The AVN must permit the position operator to deselect a frequency as controlled by classmark, by a single touch action to the frequency receiver except when the frequency is a member of a multiple site group.

f. The AVN must allow selection of receivers at each position, up to the maximum number of receivers assigned to the operator position.

g. The AVN must furnish incoming audio to the operator position HS or LS (depending upon selected routing per 3.1.2.3.14 for selected receivers).

h. The AVN must prohibit voice from the radio interface to an operator position after deselection of a frequency's receiver selector at that position.

i. The NVS must prohibit the disabling of reception for any frequency at any operator position from affecting reception on that frequency at any other position.

3.1.2.1.4.2 Muting of Receivers

a. The AVN must, as classmarked, permit position operators to remotely mute the received voice for assigned frequencies with remote mute capability.

b. The AVN must ensure that the selection of remote mute for an assigned frequency at one position does not effect a frequency deselection for that frequency at any other position with the frequency selected.

c. The AVN must, when a receiver is remotely muted, provide an indication that reflects that state at all operator positions to which the affected frequency is assigned.

d. The AVN must, under all conditions, ensure that the status of receiver remote mute is in agreement with the current radio interface state.

e. The AVN must, as classmarked, permit position operators to locally mute any assigned frequency.

3.1.2.1.4.3 Main/Standby Receiver Transfer

a. The AVN must permit the operator, at each operator position, and for each frequency assigned to the position, to transfer between main and standby receivers.

b. The AVN must permit selection/deselection of M/S receivers at each operator position independently of the transmitters as configured by classmark.

c. The AVN must provide a continuous visual indication at the operator position with radios assigned for the receiver in use at the position either main or standby.

d. The AVN must prohibit the selection of a standby receiver at the operator position, where no connection exists.

e. The AVN must ensure M/S selections for a given receiver by any operator position becomes the facility setting for all positions where the radio is assigned.

f. The AVN must ensure the selection of main or standby receiver for a selected frequency requires no more than two touch actions at the operator position.

g. The AVN must, if one touch is used, permit receiver main/standby transfer to be initiated via a single touch action of an assigned latching toggle selector at the operator position.

h. The AVN must, if two touches are used, permit the position operator to apply one touch to a main/standby function touch area, and a second touch to the receiver touch area of a selected frequency to enable selection of receiver main or standby.

i. The AVN must make each successive transfer from main to standby receiver (or vice versa) effective at all operator positions to which the affected frequency is assigned.

j. The AVN must, upon transfer from main to standby receiver (or vice versa) at the operator position, change the state of the appropriate M/S transfer circuit for the frequency.

k. The AVN must for frequencies not having standby equipment but having an assigned M/S selector, prohibit operation of this selector from having any effect on the receiver.

l. The AVN must, upon detection of a change from main to standby receiver (or vise versa), provide an indication that reflects that change at all operator positions to which the affected frequency is assigned

m. The AVN must provide no M/S receiver indications at the operator position for frequencies using BUEC.

3.1.2.1.4.4 Squelch Break

a. The AVN must provide a unique visual indication of the presence of audio (squelch break) on each A/G receiver circuit.

b. The AVN must sustain (hold over) the squelch break indication for a configurable number of seconds after the last incoming audio is detected.

c. The AVN must permit the squelch break (hold over) indication time duration to be configurable from 0 to 6 seconds in 500 ms increments.

3.1.2.1.4.5 Cross Coupling Enabling/Disabling Methods

a. The AVN must allow a receiver-to-transmitter path to be enabled by the operator position, provided that both reception and transmission on the desired path are enabled.

b. The AVN must allow a receiver-to-transmitter path to be disabled by the operator position, provided that both reception and transmission on the desired path are enabled

c. The AVN must permit an enabled transmitter-to-receiver path to be automatically torn down when the transmitter or receiver is disabled by an operator position classmarked for cross coupling this frequency pair.

d. The AVN must permit the operator position to have any receiver-to-transmitter cross-coupled path enabled at any given time.

e. The AVN must permit the operator position to have no receiver-to-transmitter cross-coupled path enabled at any given time.

3.1.2.1.5 Local Preemption

a. The AVN must permit the operator position to be classmarked for local preemption on each assigned frequency.

b. The AVN must give control of the frequencies to the preempting operator position, whenever the preempting operator activates PTT on frequencies over which the operator position has local preemption permission.

c. The AVN must terminate and lock out transmissions by any other operator positions not having local preemption permission, whenever the preempting operator position activates PTT on frequencies over which the position has local preemption permission.

d. The AVN must lock out future transmissions by other operator positions (including those who also have local preemption permission) for the duration of the preempting operator position PTT whenever the preempting operator activates PTT on frequencies over which the position has local preemption permission.

e. The AVN must distribute the preempting operator's outgoing audio to all operator positions, except the preempting position, having the frequency assigned and the receiver selected as well as to the transmitter whenever the preempting operator activates PTT on frequencies over which the position has local preemption permission.

f. The AVN must provide the preempted operator position operator a distinct visual indication on the affected frequency(ies) that preemption has occurred.

g. The AVN must provide the preempted operator position operator an audible indication that preemption has occurred.

h. The AVN must provide the preemption audible indication only to the operator position headset device(s) when one or more are attached.

i. The AVN must, when a hand microphone is the only input device connected at an operator position, route the preemption audible indication to the position LS.

j. The AVN must provide a PTT preemption tone whose frequency characteristics are identical to that used for PTT lockout.

k. The AVN must provide the PTT preemption tone for a duration as agreed upon by the Government.

l. The AVN must provide to the preempted operator position an identifier of the position that caused the preempt condition.

m. The AVN must ensure that the audible indication of PTT preemption does not obscure communications in progress.

n. The AVN must terminate the lockout upon release of PTT by preempted operator position(s).

o. The AVN must terminate the lockout upon release of PTT by preempting operator position.

p. The AVN must, when the lockout is terminated by release of PTT by preempting operator position, preclude the need for PTT release and re-key by the preempted operator position to acquire the transmitter.

3.1.2.1.6 Frequency Monitor

a. The AVN must provide a per frequency classmark that allows an operator to hear both transmit and receive audio on a specific frequency regardless of the receive audio routing setting, when receiver is selected.

b. The AVN must permit authorized personnel to assign a frequency monitor classmarked frequency to each operator position.

c. The AVN must provide controls to select / deselect each frequency monitor classmarked frequency at each operator position to which it is assigned.

3.1.2.1.7 Frequency Display

a. The AVN must provide operator positions assigned A/G communications capabilities, access to a frequency status display (summary page) which provides simultaneous visual indication of real time frequency status for all frequencies assigned to that position, up to 48 frequencies.

b. The AVN must provide operator positions access to at least 48 unique A/G frequencies (one frequency = one main/standby pair).

c. The AVN must provide display devices that can concurrently display at least 12 radio frequencies, including emergency frequencies if assigned to each operator position, with their associated status and control areas.

3.1.2.1.8 A/G Frequency Cross Coupling

a. The AVN must allow the position operator to enable the receiver-to-transmitter path(s) for cross-coupling any two designated frequencies, which are not operating in selective mode.

b. The AVN must be able to cross couple at least two sets of two frequencies at each position.

c. The AVN must be able to cross couple the transmit and the received voice of one frequency of the set over the other frequency of the set without operator intervention.

d. The AVN must control cross-couple assignment by classmark at each operator position.

e. The AVN must ensure that cross coupling does not degrade signaling time or voice quality at any of the multiple positions assigned either of the cross-coupled frequencies.

f. The AVN must recognize a request from the operator position for enabling cross-coupling of the designated frequencies.

g. The AVN must provide connectivity from the radio designated for reception, to the radio designated for transmission.

h. The AVN must, when receiving a squelch break signal from the radio interface for cross-coupling, generate PTT signaling and provide the voice to the radio interfaces on the frequency designated for transmission.

i. The NVS must recognize the reception of voice signals as the squelch break for cross-coupling and then generate the PTT signal to the radio designated for transmission, if the radio does not provide a discrete squelch break signal.

j. The AVN must recognize and implement a request for disabling cross coupling of the designated frequencies.

k. The AVN must permit any operational position's activation of PTT for the interface to preempt the cross-coupled transmission.

l. The AVN must, when a cross-coupled transmission is active and an operator assigned the cross-coupled frequencies activates PTT, establish the operator as the preemptor for voice transmission and PTT signaling.

m. The AVN must re-establish the active cross-coupling when PTT is released by the preemptor.

3.1.2.1.9 Selection and Assignment of BUEC/ECS

a. The AVN must provide access to the BUEC/ECS system from each operator position that has A/G communications capabilities enabled.

b. The AVN must permit BUEC/ECS selection and frequency assignment to be accomplished through operator actions using the TED(s).

c. The AVN must permit a position operator to activate the BUEC/ECS selection function with a single touch action.

d. The AVN must provide a visual indication that the BUEC/ECS selection function is enabled.

e. The AVN must, upon a subsequent touch action to a displayed frequency designated as BUEC/ECS capable, enable BUEC/ECS for that frequency, and provide the visual indication for BUEC/ECS enabled.

f. The AVN must automatically disable the BUEC/ECS selection function if no frequency designation is made within 15 seconds after the BUEC/ECS selection function is enabled.

g. The AVN must, for any given frequency at an operator position accessing BUEC/ECS, inhibit using any communication control normally provided by the radio interface for that frequency.

3.1.2.1.9.1 BUEC/ECS Indications

a. The AVN must provide visual indications of which frequency or frequencies, if any, have been selected for and are using the BUEC/ECS system.

3.1.2.1.9.2 BUEC/ECS Deselection

a. The AVN must, when the BUEC/ECS function is enabled and a frequency that is currently assigned to BUEC/ECS is touched, disable BUEC/ECS for that frequency, and disable the BUEC/ECS selection function and its visual indication.

b. The AVN must, when BUEC/ECS is disabled for a frequency, ensure that the M/S transmitter status for the frequency reverts to the current selection status in effect as determined by the NVS radio interface.

c. The AVN must, when BUEC/ECS is disabled for a frequency, ensure that the M/S receiver selection status for the frequency reverts to the current selection status in effect as determined by the NVS radio interface.

d. The AVN must, when BUEC/ECS is disabled for a frequency, ensure that the remote mute receiver selection status for the frequency reverts to the current selection status in effect as determined by the AVN radio interface.

e. The AVN must permit BUEC/ECS for a selected frequency to be deselected by a two-touch action.

3.1.2.2 Ground-To-Ground (G/G) Communications

Two types of ground-to-ground (G/G) calls are referenced in the following section. They are Intercom (IC) and Interphone calls.

IC calls refer to position-to-position calls between NVS operator positions, regardless of their location within the NVS enterprise. IC calls can be intra-AVN or inter-AVN. Calls between operator positions connected to separate AVNs using the GFE wide area network are considered IC calls. IC calls over the WAN will eventually replace many of the telephone calls currently connected over dedicated telephone circuits and therefore, must emulate the functionality provided by the traditional telephone circuits. The IC call may be configured to connect one operator position to one other operator position, or one operator position to multiple other operator positions, based on operational requirements. The endpoint of the call (visual indication of inbound call and alerting), and the type of call (i.e., chime, voice, or override call) must be controlled by the called AVN, not the calling AVN.

Interphone calls refer to NVS operator position-to-legacy analog trunk or legacy analog trunk-to-NVS operator position calls.

a. The NVS must, for intra-AVN calls, utilize the called AVN to determine the endpoint routing and alerting.

b. The NVS must permit authorized personnel to define intercom (IC) calls between any NVS operator positions.

c. The AVN must permit authorized personnel to define at least 51,200 intercom (IC) calls originating or terminating at the AVN.

d. The NVS must prevent audio feedback due to loop closure of override calls.

e. The NVS must prevent audio feedback due to loop closure of operator position monitoring.

f. The NVS must prevent audio feedback due to loop closure of override calls in conjunction with operator position monitoring.

3.1.2.2.1 Outbound G/G Call

a. The NVS must permit authorized personnel to assign G/G DA selectors as latching for each G/G DA assigned to the operator position.

b. The NVS must permit authorized personnel to assign G/G DA selectors as non-latching for each G/G DA assigned to the operator position.

c. The AVN must permit the operator to initiate a G/G call by activation of a direct access (DA) selector (if any) assigned to the call.

d. The AVN must permit G/G DA calls to be initiated at an operator position using latching touch activations.

e. The AVN must permit G/G DA calls to be initiated at an operator position using non-latching touch activations.

f. The AVN must permit the operator to initiate all types of IC G/G calls defined in 3.1.2.2.2.3 that are available for use by the operator position through activation of a direct access (DA) selector (if any) assigned to the call.

g. The AVN must permit the operator to initiate all types of Interphone G/G calls defined in 3.1.2.2.2.4 that are available for use by the operator position through activation of a direct access (DA) selector (if any) assigned to the call.

h. The AVN must permit the operator to initiate a G/G call via the indirect access (IA) keypad (3.1.2.3.2) by entry of a code assigned to the call.

i. The AVN must permit the operator to initiate all types of IC G/G calls defined in 3.1.2.2.2.3 that are available for use by the operator position by entry of a code assigned to the call via the indirect access (IA) keypad (3.1.2.3.2).

j. The AVN must permit the operator to initiate all types of Interphone G/G calls defined in 3.1.2.2.2.4 that are available for use by the operator position by entry of a code assigned to the call via the indirect access (IA) keypad (3.1.2.3.2).

k. The AVN must, upon initiation of a G/G call, provide call progress tones to the calling position.

l. The AVN must, upon initiation of G/G calls, provide visual indication of call in-use at the DA selector assigned to the call, if any, at each operator position configured with a DA for the call that is not a destination for the call.

m. The NVS must, upon initiation of an IC Chime call, connect the call in accordance with 3.1.2.2.2.3.1.

n. The NVS must, upon initiation of an IC Voice call, connect the call in accordance with 3.1.2.2.2.3.2.

o. The NVS must, upon initiation of an IC OVR call, connect the call in accordance with 3.1.2.2.2.3.3.

p. The AVN must, at the calling operator position, upon connection of an outgoing IC OVR call, provide continuous visual indication of active call at the DA selector assigned to the call, if any.

q. The AVN must, at the calling operator position, upon connection of an outgoing IC OVR call, provide continuous visual indication of active call at the calling operator position if the calling operator position does not have a DA assigned to the call.

r. The AVN must, upon initiation of an Interphone call, provide outgoing call signaling to the circuit interface appropriate to the type of trunk or circuit and the type of call in accordance with 3.3.6.

s. The AVN must permit authorized personnel to classmark each Interphone circuit such that, upon initiation of an Interphone call, call progress tones are provided to the position initiating the call.

t. The NVS must permit authorized personnel to classmark each Interphone circuit to disabled call progress tones on outgoing calls.

u. The NVS must permit authorized personnel to assign an operator position classmark for any CO/PABX circuit to permit access to the circuit by the operator position.

v. The NVS must permit authorized personnel to assign an operator position classmark for any CO/PABX circuit to restrict dialing of definable sequences by the operator position.

w. The NVS must permit authorized personnel to define restricted dialing sequences of at least 11 digits for any Interphone circuit.

x. The AVN must, whenever the operator seizes an Interphone circuit of a type that requires or permits additional dialing for call routing or other purposes, permit the operator to enter additional digits at the IA keypad.

y. The AVN must, whenever the operator seizes an Interphone circuit of a type that requires or permits additional dialing for call routing or other purposes, provide such digits to the interphone circuit interface in the format appropriate to the circuit (e.g., SS-4 tone burst, DTMF tone burst, dial pulse train, etc.).

z. The AVN must, whenever the operator seizes a circuit of a type that permits manual ring or re-ring, permit the operator to operate the manual ring DA selector in accordance with 3.1.2.2.7.7.

aa. The AVN must, whenever the operator seizes a circuit of a type that permits hook flash signaling for the operation of special functions on external networks and systems, permit the operator to operate the hook flash selector in accordance with 3.1.2.2.7.6.

bb. The AVN must, whenever the operator seizes a circuit of a type that does not permit the dialing of additional digits, ensure that the IA keypad is not activated.

cc. The AVN must permit the operator to initiate a G/G call by selection of the call from the operator position electronic contact list defined in 3.1.2.2.7.13.1.

3.1.2.2.2 Inbound G/G Call Pending

3.1.2.2.2.1 Common Answer Queue Operation

a. The AVN must, for an incoming call to an operator position that does not have a corresponding DA selector for answering the call (where answering is required), direct the call to the called operator position's common answer (CA) queue.

b. The AVN must permit the operator to answer incoming G/G calls in the operator position's CA queue.

c. The AVN must permit the operator to answer a call in the operator position's CA queue in any order.

d. The AVN must permit the operator to answer any call in the operator position's CA queue by no more than two touch actions.

e. The AVN must accommodate at least seven G/G calls in the operator position CA queue, including an active CA queue call and queue calls on hold.

f. The NVS must provide a busy tone to the calling party when the called operator position's CA queue is full.

g. The AVN must provide a visual and momentary audio indication to the called operator position attempting to add a call to the CA queue when the CA queue is full, as when the operator attempts to place on hold a call initiated via IA.

h. The AVN must provide at the operator position a visual display of all calls in the operator position CA queue.

i. The AVN must provide at the operator position status of all calls in the operator position CA queue.

j. The AVN must permit the operator to remove from hold a call in the operator position's CA queue in any order.

k. The NVS must establish voice connectivity when a call in the operator position's CA queue is selected for answering.

3.1.2.2.2.2 Simultaneous Override Conference

a. The AVN must permit any operator position to be simultaneously overridden by at least 9 other NVS operator positions.

b. The AVN must permit at least 32 simultaneous override conferences per 100 operator positions.

c. The NVS must permit the number of simultaneous override conferences corresponding to the sum of simultaneous override conferences permitted by each AVN in the NVS enterprise.

d. The AVN must exclude the number of simultaneous override conferences from the total number of conferences in Section 3.1.2.2.7.2.

e. The NVS must ensure that if any of the operator positions overriding a single operator position are themselves being overridden, all operator positions are connected to form one composite override conference call subject to the simultaneous override conference limitation and override loop closure restrictions.

f. The NVS must ensure that no incoming override call is blocked (not connected) to the overridden operator position.

g. The NVS must, when the simultaneous override conference limit is reached, as described in (b), establish a two party override conference between the overridden and the overriding operator position.

h. The NVS must provide an alert to authorized personnel each time the simultaneous override conference limit is reached, as described in (b), for each override conference.

3.1.2.2.2.3 Inbound IC Call

a. The NVS must permit authorized personnel to assign an IC call as an inbound chime call.

b. The NVS must permit authorized personnel to assign an IC call as an inbound voice call.

c. The NVS must permit authorized personnel to assign an IC call as an inbound override call.

d. The NVS must permit authorized personnel to assign an IC call as private.

e. The NVS must permit authorized personnel to assign an IC call as conferenceable.

f. The AVN must permit authorized personnel at the called facility to assign the operator position(s) to which an inbound IC call is directed for each defined IC call.

g. The AVN must permit authorized personnel at the called facility to assign any operator position as the operator position(s) to which an inbound IC call is directed for each defined IC call.

h. The AVN must allow up to 800 operator positions at the called facility to be assigned as the operator position(s) to which an inbound IC call is directed for each defined IC call.

i. The AVN must permit authorized personnel at the called facility to enable the audio call alerting for each operator position to which an inbound IC call is directed for each defined IC call.

j. The AVN must permit authorized personnel at the called facility to disable the audio call alerting for each operator position to which an inbound IC call is directed for each defined IC call.

3.1.2.2.2.3.1 IC Chime Call

a. The AVN must, upon receipt of an IC chime call, provide incoming call chime at the called operator position(s) configured for incoming chime alert and having the operator position chime control activated.

b. The AVN must, upon receipt of an IC chime call, provide continuous visual indication of incoming call at the DA selector assigned to the call, if any, at each operator position configured to receive the call.

c. The AVN must, upon receipt of an IC chime call, provide continuous visual indication of incoming call at the CA selector (reference 3.1.2.3.2) if no DA selector is configured at the called operator position.

d. The NVS must, if the IC chime call is received as a result of call forwarding and there is no DA selector assigned for the forwarding operator position's IC chime call, provide incoming call chime at the forwarded-to position if the forwarding operator position, or any operator position preceding the forwarding operator position in a call forwarding chain, is classmarked for incoming chime alert on the call.

e. The NVS must, upon receipt of an IC chime call, provide ringback tone to the calling operator position.

f. The AVN must continue the audio and visual indications established in (a), (b), (c), and (d) above until the call is answered by the first called operator position (3.1.2.2.3), unless the call is abandoned by the calling party.

g. The AVN must continue the audio and visual indications established in (a), (b), (c), and (d) above until the call is abandoned by the calling operator position (3.1.2.2.4), unless the call is answered by any operator position.

h. The AVN must continue to provide the incoming chime at the called operator position until the last incoming G/G call to the operator position has been answered, unless the call has been abandoned by the calling party.

i. The AVN must continue to provide the incoming chime at the called operator position until the last incoming G/G call to the operator position has been abandoned, unless the call has been answered by any operator position.

3.1.2.2.2.3.2 IC Voice Call

a. The AVN must, upon detection of incoming audio on an IC voice call, at each operator position to which a DA selector has been assigned for the call, provide a visual indication of incoming call at the DA selector assigned for the call.

b. The AVN must, upon detection of incoming audio on an IC voice call, at each operator position to which a DA selector has been assigned for the call, direct the incoming audio from the call to the operator position loudspeaker at each operator position with incoming voice alert enabled on the call.

c. The AVN must, upon receipt of an IC voice call, provide continuous visual indication of incoming call at the CA selector (reference 3.1.2.3.2) if no DA selector is configured at the called operator position.

d. The AVN must, if the IC voice call is received as a result of call forwarding and there is no DA selector assigned for the forwarding operator position's IC voice call circuit, direct the incoming audio from the circuit to the operator position loudspeaker if the forwarding operator position, or any operator position preceding the forwarding operator position in a call forwarding chain is classmarked for incoming voice alert on the call.

e. The AVN must continue the audio and visual indications established in (a), (b), (c), and (d) above until the call is answered by the first called operator position (3.1.2.2.3), unless the call is abandoned by the calling position.

f. The AVN must continue the audio and visual indications established in (a), (b), (c), and (d) above until the call is abandoned by the calling operator position (3.1.2.2.4), unless the call is answered by any operator position.

3.1.2.2.2.3.3 IC Override Call

An override (OVR) call is a high priority call that is connected to the called operator position(s) automatically, joining the called operator position(s)' calls in progress, without requiring any action by the called operator position(s). OVR calls are traditionally connected between one operator position and one other operator position. NVS, however, will need to provide one-to-multiple operator position OVR calls (in one direction only) as well.

a. The AVN must, at the called operator position(s), upon connection of an incoming IC OVR call, provide continuous visual indication of active incoming OVR call at the DA selectors assigned to the call, if any.

b. The AVN must, at the called operator position, upon connection of an incoming IC OVR call, provide continuous visual indication of active call at the called operator position if the called operator position does not have a DA assigned to the call.

c. The AVN must, at the called operator position(s), upon connection of an incoming IC OVR call, provide continuous visual indication of active incoming OVR call.

d. The AVN must, at the called operator position, display the caller identity display(s) of at least the first five (5) overriding caller(s) for the duration of the OVR call(s).

e. The AVN must, when an operator position is overridden by more operator positions than can be displayed in the caller identity display, ensure that the overridden operator position's override list displays the caller identity of at least the first five (5) overriding operator positions in the order in which the OVR calls were received.

f. The AVN must, when any of the displayed overrides in (f) above releases, update the override list to include the override caller identity(s) of the next overriding operator position(s), determined by the order in which the calls were received.

g. The AVN must require no operator action at the called operator position(s) to answer an incoming IC OVR call.

h. The NVS must, upon connection of an incoming IC OVR call, establish an audio path between the called operator position(s) and the calling operator position.

i. The AVN must, at the called operator position(s), upon receipt of an IC OVR call from another operator position, immediately connect the incoming OVR call to the called operator position(s) without disconnecting any calls in progress at the called operator position(s), subject to loop closure restrictions.

j. The AVN must, at the called operator position(s), upon receipt of an IC OVR call from another operator position, immediately connect the incoming OVR call to the called operator position(s) up to the limit for incoming override calls (3.1.2.2.2.2), subject to loop closure restrictions.

k. The AVN must, at the called operator position(s), when the overridden operator position is operating in non-split functionality mode, upon receipt of an IC OVR call from another operator position, immediately connect the incoming OVR call to the called operator position(s) such that the overriding caller hears all calls to the overridden operator position(s), including A/G communications, subject to loop closure restrictions.

l. The NVS must, when the overridden operator position is operating in position split functionality mode, ensure that the overriding operator position receives all G/G communications emanating from or directed to the overridden operator position's G/G jack module and G/G loud speaker, including any monitor audio.

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m. The NVS must, as configured by position classmark, at the called operator position(s), upon receipt of an IC OVR call from another operator position, provide a momentary audio indication of override to all operator positions and G/G interphone circuits involved in the conference, including the incoming OVR caller.

n. The NVS must, at the called operator position(s), upon receipt of an IC OVR call from another operator position, not provide the audio from the overriding operator position to any A/G transmitter selected at the overridden operator position(s).

o. The AVN must, at the called operator position(s), upon receipt of an IC OVR call from another operator position, permit the overridden operator position(s) to communicate with the overriding operator position(s) without the use of PTT, regardless of the PTT for G/G calls setting (3.1.2.2.6).

p. The AVN must, at the called operator position(s), upon receipt of an IC OVR call from another operator position, permit the overridden operator position(s) to communicate with all other overridden operator position(s) without the use of PTT, regardless of the PTT for G/G calls setting (3.1.2.2.6).

3.1.2.2.2.4 Inbound Interphone Call

a. The AVN must permit authorized personnel to assign an Interphone call as an inbound selective signaling call.

b. The AVN must permit authorized personnel to assign an Interphone call as a selective inbound dial call.

c. The AVN must permit authorized personnel to assign an Interphone call as an inbound non-selective call.

d. The AVN must permit authorized personnel to assign an Interphone call as an inbound override call.

e. The AVN must permit authorized personnel to assign an Interphone call as an inbound voice call.

f. The AVN must permit authorized personnel to assign the operator position(s) to which an inbound Interphone call is directed.

g. The AVN must permit authorized personnel to assign any AVN operator position(s) as an inbound Interphone call destination.

h. The NVS must permit inbound Interphone call destinations to be retained if the logical position is moved between AVNs.

i. The AVN must permit authorized personnel to assign the call alerting for each operator position to which an inbound Interphone call is directed.

j. The NVS must permit inbound Interphone call alerting to be retained if the logical position is moved between AVNs.

3.1.2.2.2.4.1 Interphone Selective Signaling (SS) Calls

Selective signaling (SS) calls are selective inbound and employ address signaling to identify the called operator position or group of operator positions. The called operator positions are notified of a pending call by visual indication and by ringing if the operator position is configured for alert. Upon answer of the call by the first operator position, the alert is discontinued at all operator positions and an active or busy visual indication is provided to all operator positions, with a selector for the call. These circuits usually serve multiple facilities, so the ability to distinguish between valid dial codes for the receiving facility is essential.

a. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, accept and decode the call address.

b. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, determine whether the address information refers to any NVS operator position(s).

c. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, provide continuous visual indication of incoming call at the DA selector assigned to the Interphone circuit, if any, at each operator position to which the call address refers.

d. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, provide continuous visual indication of incoming call at the CA selector at each operator position to which the call address refers if no DA selector for the Interphone circuit is assigned.

e. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, activate incoming call chime at each operator position classmarked to receive incoming call chime to which the call refers, and at which call chime has been activated by the position operator.

f. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, continue the chime and visual indication established in (c), (d), and (e) above until the call is answered by an operator position (3.1.2.2.3), unless the call times out.

g. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit interface classmarked for selective signaling, discontinue the chime and visual indication established in (c), (d), and (e) above, when the call has not been answered by any operator position after a preconfigured Selective Signaling disconnect timeout.

h. The AVN must permit authorized personnel to configure the Interphone Selective Signaling disconnect timeout from 1 to 180 seconds in increments of 1 second.

3.1.2.2.2.4.2 Interphone Selective Inbound Dial Calls

a. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, accept and decode the call address.

b. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, provide continuous visual indication of incoming call at each operator position to which the call address refers, at the DA selector (if any) assigned to the Interphone circuit.

c. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, provide continuous visual indication of incoming call at each operator position to which the call address refers at the CA selector, if no DA selector is assigned.

d. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, activate incoming call chime at each operator position to which the call address refers, and at which call chime has been activated by position operator.

e. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, provide ringback tone to the Interphone circuit, when the Interphone circuit is classmarked to send ringback.

f. The AVN must, upon detection of appropriate incoming call address signaling from an Interphone circuit classmarked for incoming dial, continue the visual indication in c), chime in d) and ringback tone in e) until the call is answered by an operator position (3.1.2.2.3), unless the call has been abandoned by the calling party.

g. The AVN must, upon detection of appropriate incoming call address signaling from an interphone circuit classmarked for incoming dial, continue the visual indication in c), chime in d) and ringback tone in e) until the call is abandoned by the calling party (3.1.2.2.4), unless the call has been answered by any operator position.

3.1.2.2.2.4.3 Interphone Non-Selective Call

a. The AVN must, upon detection of an appropriate incoming seize from the Interphone circuit classmarked for non-selective service, including automatic or manual ring (re-ring), provide continuous visual indication of incoming call at each position to which the call refers at the DA selector (if any) assigned to the Interphone circuit.

b. The AVN must, upon detection of an appropriate incoming seize from the interphone circuit classmarked for non-selective service, including automatic or manual ring (re-ring), provide continuous visual indication of incoming call at each operator position to which the call refers at the CA selector if no DA selector is assigned.

c. The AVN must, upon detection of an appropriate incoming seize from the Interphone circuit classmarked for non-selective service, including automatic or manual ring (re-ring), activate incoming call chime at each operator position to which the call is directed where the position is classmarked to receive incoming call chime on the call, and at which call chime has been activated by the position operator.

d. The AVN must, upon detection of an appropriate incoming seize from the Interphone circuit classmarked for non-selective service, including automatic or manual ring (re-ring), provide ringback tone to the

Interphone circuit when the Interphone circuit has been classmarked to send ringback.

e. The AVN must continue the visual indication, chime, and ringback tone established in (a), (b), and (c) above until the call is answered by an operator position (3.1.2.2.3), unless the call has been abandoned by the calling party.

f. The AVN must continue the visual indication, chime, and ringback tone established in (a), (b), and (c) above until the call is abandoned by the calling party (3.1.2.2.4), unless the call has been answered by any operator position.

3.1.2.2.2.4.4 Interphone Override Call

An override (OVR) call is a high priority call that is connected to the called operator position(s) automatically, joining the called operator positions' calls in progress, without requiring any action by the called operator position(s). Upon connection of the call, an active visual indication and momentary audio indication are provided to all operator positions involved in the call. The calling operator position (whether on NVS or at the other end of the telephone circuit) usually disconnects the call. A method needs to be provided for the called operator position to disconnect the call in the event that the circuit malfunctions. Ringback tone is not provided on an OVR call.

a. The AVN must, at the called operator position, upon connection of an incoming interphone OVR call, provide continuous visual indication of active incoming OVR call at the DA selectors assigned to the call, if any.

b. The AVN must, at the called operator position, upon connection of an incoming interphone OVR call, provide continuous visual indication of active incoming OVR call at the called operator position if the operator position does not have a DA assigned to the call.

c. The AVN must, at the called operator position, upon connection of an incoming interphone OVR call, provide continuous visual indication of active incoming OVR call.

d. The AVN must, at the called operator position, display the caller identity display(s) of at least the first five (5) overriding Interphone circuits for the duration of the OVR call(s).

e. The AVN must, when an operator position is overridden by more operator positions than can be displayed in the caller identity display, ensure that the overridden operator position's override list displays the caller identity of at least the first five (5) overriding Interphone circuits in the order in which the OVR calls were received.

f. The AVN must, when any of the displayed overrides in (f) above releases, update the override list to include the override caller identity(s) of the next overriding Interphone circuit(s), determined by the order in which the calls were received.

g. The AVN must require no operator action to answer an incoming Interphone OVR call.

h. The AVN must, upon connection of an incoming interphone OVR call, establish an audio path between the called operator position and the analog circuit interface bearing the incoming call.

i. The AVN must, at the called operator position(s), upon receipt of an Interphone OVR call, immediately connect the incoming OVR call to the called operator position(s) without disconnecting any calls in progress at the called operator position(s), subject to loop closure restrictions.

j. The AVN must, at the called operator position, upon receipt of an Interphone OVR call, immediately connect the incoming OVR call to the called operator position up to the limit for incoming override calls (3.1.2.2.2.2), subject to loop closure restrictions.

k. The AVN must, at the called operator position operating in non-split mode, upon receipt of an Interphone OVR call, immediately connect the incoming OVR call to the called operator position such that the overriding caller hears all calls to the overridden operator position, including A/G communications, subject to loop closure restrictions.

l. The AVN must, when the overridden operator position is operating in position split functionality mode, ensure that the analog circuit interface bearing the incoming call receives all G/G communications emanating from or directed to the overridden operator position's G/G jack module and G/G loud speaker, including any monitor audio.

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m. The AVN must, as configured by position classmark, at the called operator position, upon receipt of an Interphone OVR call, provide a momentary audio indication of override to all operator positions and G/G interphone circuits involved in the override conference, including the incoming OVR caller.

n. The AVN must, at the called operator position, upon receipt of an Interphone OVR call, not provide the audio from the analog circuit interface bearing the incoming call to any A/G transmitter selected at the overridden operator position.

o. The AVN must, at the called operator position, upon receipt of an Interphone OVR call, permit the overridden operator position to communicate with the analog circuit interface bearing the incoming call without the use of PTT, regardless of the PTT for G/G calls setting (3.1.2.2.6).

p. The AVN must permit authorized personnel to classmark each circuit to process incoming calls as One-way inbound override where appropriate call progress tones per 3.1.2.2.7.14 are provided once the audio path is established for the call.

q. The AVN must permit authorized personnel to classmark each circuit to process calls as two-way override where call progress tones are disabled on outbound calls and appropriate call progress tones per 3.1.2.2.7.14 are provided once the audio path is established for inbound calls.

3.1.2.2.2.4.5 Interphone Voice Call

a. The AVN must, upon detection of incoming audio on an Interphone circuit classmarked for voice call service, at each operator position to which a DA selector has been assigned for the call provide a visual indication of incoming call at the DA selector assigned for the call.

b. The AVN must, upon detection of incoming audio on an Interphone circuit classmarked for voice call service, at each operator position to which a DA selector has been assigned for the call and for which the operator position is classmarked for incoming voice alert on the call, direct the incoming audio from the call to the operator position loudspeaker.

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c. The AVN must, if the voice call is received as a result of call forwarding, and there is no DA selector assigned for the voice call circuit at the forwarded-to position, provide a visual indication of the incoming call at the CA selector at the forwarded-to position.

d. The AVN must, if the voice call is received as a result of call forwarding, and there is no DA selector assigned for the voice call circuit at the forwarded-to position, direct the incoming audio from the circuit to the operator position loudspeaker if the forwarding operator position (or any operator position preceding the forwarding operator position in a call forwarding chain) is classmarked for incoming voice alert on the circuit.

e. The AVN must, upon detection of incoming audio on an interphone circuit classmarked for voice call service, if the voice call has not been answered and the preconfigured interphone voice call disconnect timeout has elapsed without detection of further audio on the Interphone circuit, discontinue the visual indication in (a) and voice alert in (b).

f. The AVN must permit authorized personnel to configure the voice call Interphone circuit disconnect timeout from 1 to 180 seconds in increments of 1 second.

3.1.2.2.3 Inbound G/G Call Answering

a. The AVN must permit the operator to answer incoming G/G calls by activation of the DA selector assigned to the call, if any.

b. The AVN must permit the operator to answer incoming G/G calls by entry of a code assigned to the call, via the IA keypad.

c. The AVN must permit the operator to answer incoming G/G calls by activation of the CA selector, if the call is specifically directed to the called position, but no DA for the call has been assigned.

d. The AVN must permit the operator to answer incoming G/G calls by use of position contact list (3.1.2.2.7.13.1).

e. The NVS must, upon answering of an incoming IC non-OVR call, establish an audio path between the answering operator position and the calling operator position.

f. The NVS must, upon answering of an incoming interphone non-OVR call, establish an audio path between the answering operator position and the analog circuit interface bearing the incoming call.

g. The NVS must, upon answering of an incoming G/G non-OVR call, discontinue the incoming call alert, whether chime or voice, for the current call at all operator positions receiving call alert for that incoming call.

h. The NVS must, upon answering of an incoming G/G non-OVR call, ensure incoming call alert, whether chime or voice, for all other unanswered incoming calls at all operator positions configured to receive call alert for those incoming calls, continues until the call(s) is (are) answered, unless the call is abandoned or times out.

i. The NVS must, upon answering of an incoming G/G non-OVR call, ensure incoming call alert, whether chime or voice, for all other unanswered incoming calls at all operator positions configured to receive call alert for those incoming calls, continues until the call(s) is (are) abandoned, unless the call(s) is (are) answered or time out.

j. The NVS must, upon answering of an incoming G/G non-OVR call, ensure incoming call alert, whether chime or voice, for all other unanswered incoming calls at all operator positions configured to receive call alert for those incoming calls, continues until the call(s) time out, unless the call(s) is (are) answered or abandoned.

k. The AVN must, upon answering an incoming G/G non-OVR call, discontinue any call progress tones provided with the call.

l. The AVN must, upon answering of an incoming IC non-OVR call, at the calling operator position for DA generated IC calls, provide continuous visual indication of active call at the DA selector assigned to the call.

m. The AVN must, upon answering of an incoming IC non-OVR call, at the calling operator position for IA generated IC calls, provide continuous visual indication of active call to the CA selector if the operator position does not have a DA assigned to the call.

n. The AVN must, upon answering of an incoming G/G non-OVR call, at the answering operator position, provide continuous visual indication of active call at the DA selectors assigned to the call, if any.

o. The AVN must, upon answering of an incoming G/G non-OVR call, at the answering operator position provide continuous visual indication of active call to the CA selector if the operator position does not have a DA assigned to the call.

p. The NVS must, upon answering of an incoming G/G non-OVR call, at all other operator positions having a DA selector assigned to the call, provide continuous visual indication of in-use call at the DA selector(s) assigned for the call.

3.1.2.2.4 G/G Call Release and Termination

a. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, by placement of another G/G, except during progressive conferences.

b. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, by answering an incoming call.

c. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, by deselecting the DA selector assigned to the call if the call appears as a DA call.

d. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, by selection of a call release selector.

e. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, if the call appears at the CA selector, by deselecting the CA selector.

f. The AVN must permit the operator to release G/G calls in progress (i.e., not on hold), except for OVR calls in which the operator is the called party, by resuming a call previously placed on hold.

g. The AVN must release an operator position's G/G call when the operator position becomes inactive.

h. The AVN must permit the operator to release incoming OVR calls in progress only by entry of an assigned IA code.

i. The AVN must release any interphone calls in progress whenever appropriate call termination signaling is received from the interphone interface bearing the call.

j. The AVN must provide disconnection of a G/G call, with the exception of OVR calls, meet-me conferences and calls using unsupervised interphone circuits, when either of the last two parties on the call releases the call.

k. The AVN must, if the Interphone circuit bearing an active call is of a type that does not provide call termination signaling, not release the call until the last NVS operator on the call releases the call.

l. The AVN must, upon call release of an interphone circuit that does not recognize call disconnect signaling (e.g., a local telephone), provide Receiver on Hook audio tone to the line in accordance with 3.1.2.2.7.14 for ten (10) seconds after not receiving a valid On-hook signal for thirty (30) seconds.

m. The NVS must, upon IC call release, discontinue audio path between the called operator position(s) and calling operator position.

n. The AVN must, upon interphone call release at an NVS operator position, discontinue audio path between the NVS operator position and the Interphone circuit bearing the call.

o. The AVN must, upon G/G call release, discontinue visual indications of active call at the called NVS operator position(s)

p. The AVN must, upon G/G call release, discontinue visual indications of active call at the calling NVS operator position.

q. The AVN must, upon G/G call release, discontinue visual indication of in-use status at all NVS operator positions having a DA assigned for the call but not participating in the call.

r. The AVN must discontinue indication of pending G/G call at the calling operator position if the call was abandoned prior to the called operator position(s) answering.

s. The AVN must discontinue indication of pending G/G call at the called operator position(s) if the call was abandoned prior to the called operator position(s) answering, unless the inbound call is using an interface not configured for call disconnect signaling.

t. The AVN must discontinue indication of pending G/G call at the called operator position(s) if the inbound call is using an interface not configured for call disconnect signaling and the inbound call times out.

3.1.2.2.5 G/G Interphone Circuit Conferencing

a. The AVN must, upon each attempt to access a trunk or circuit that is in use and that has been designated private by classmark, reject the call attempt and provide busy tone to the attempting position.

b. The AVN must, upon each attempt to access a trunk or circuit that is in use and that has not been designated private by classmark, immediately connect the attempting operator to the circuit such that the attempting operator can hear and be heard by all other parties on the circuit.

c. The AVN must, upon each attempt to access a trunk or circuit that is in use and that has not been designated private by classmark, provide a visual indication of active call at the attempting position, either at the DA selector assigned to the call (if any), or at the IA selector.

d. The AVN must, upon each attempt to access a trunk or circuit that is in use and that has not been designated private by classmark, permit at least 6 operators to join the trunk or circuit (not to be counted as a conference call per 3.1.2.2.7.2).

e. The AVN must, upon each attempt to access a trunk or circuit that is in use and that has not been designated private by classmark, provide a busy tone to any position attempting to access the trunk or circuit in excess of the NVS's ability to provide simultaneous connection.

3.1.2.2.6 Use of PTT in G/G Communications

a. The AVN must provide two options to each position for the use of PTT in G/G communications, one of which is selectable by position classmark during reconfiguration..

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3.1.2.2.6.1 Option 1 (No PTT for G/G Calls)

a. The AVN must, for option 1, require no operator PTT activation for communications on any G/G call.

b. The AVN must, for option 1, upon PTT activation, connect the operator's audio to the selected A/G transmitters while maintaining communications with any G/G calls in progress.

c. The AVN must, for option 1, upon PTT activation, route all G/G receive audio to the position LS, except for incoming OVR calls.

d. The AVN must, for option 1, upon PTT release, un-key the selected A/G transmitters.

e. The AVN must, for option 1, upon PTT release, disconnect the operator from previously keyed transmitters.

f. The AVN must, for option 1, upon PTT release, restore all incoming G/G call audio routing.

3.1.2.2.6.1.1 Simultaneous G/G and A/G Calls

a. The AVN must, under PTT Option 1, permit each operator to receive A/G audio at any time during any G/G call without interrupting the G/G call.

b. The AVN must only furnish audio received from A/G frequencies to the calling position operator when the calling party has placed an OVR call to the position, or when A/G-G/G coupling is in effect at the position.

c. The AVN must continue to furnish G/G call audio (transmitted and received) during the receipt of A/G audio call.

d. The AVN must prohibit audio from the G/G caller to be sent over A/G frequencies.

e. The AVN must ensure that the activation of A/G voice transmission using a PTT device is not precluded, nor affected by the use of non-latching DA selectors for G/G communications.

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f. The AVN must provide for simultaneous A/G and G/G communications emanating from a position when non-latching G/G DA selectors are used in concert with a PTT device for A/G communications.

3.1.2.2.6.2 Option 2 (PTT for G/G Calls)

a. The AVN must for option 2, require operator PTT activation for communications on any G/G call , except OVR calls.

b. The AVN must, for option 2, with no A/G transmitters selected for transmission and upon PTT activation, connect the position audio to all G/G parties, except for inbound override calls.

c. The AVN must, for option 2, upon PTT release on an active G/G call, disconnect the operator microphone audio to all G/G parties

d. The AVN must, for option 2, with A/G transmitters selected for transmission and upon PTT activation, key those transmitters after the operator has terminated or placed on hold all ongoing G/G calls (except for incoming override calls, where such termination is not possible).

e. The AVN must, for option 2, require the position operator to release and re-key PTT to transition from G/G voice transmission to A/G voice transmission after the active G/G is released or placed on hold with the exception of an incoming OVR.

f. The AVN must, for option 2, permit simultaneous A/G and G/G communications from a single position by ensuring that the activation of an A/G PTT is permitted in conjunction with the use of non-latching DA selectors for G/G communications.

g. The AVN must, for incoming OVR calls, continue to route the OVR audio as selected at the position.

h. The AVN must, for option 2, upon PTT release, disconnect the operator audio and signaling from the selected and enabled transmitters.

i. The AVN must, for option 2, upon PTT release, un-key any active A/G transmitters.

3.1.2.2.7 G/G Call Features

3.1.2.2.7.1 Call Hold

a. The AVN must permit each position operator to put the active G/G call on hold with a single touch to a designated HOLD DA selector.

b. The AVN must permit any type of G/G calls to be placed on hold except for incoming OVR calls.

c. The AVN must, during call hold, prohibit transmission of audio between the parties on hold and the operator initiating the hold.

d. The AVN must, during call hold, permit the initiating operator to place A/G calls and other G/G calls as if no G/G call were active.

e. The AVN must, for each call on hold, provide a visual indication of call-on-hold to the DA selector (if any) at the position initiating the call on hold.

f. The AVN must, for each call on hold, provide a visual indication of call-on-hold to the IA selector of the initiating position if the call on hold was placed as an IA call.

g. The AVN must, for each call on hold, provide a visual indication of call-on-hold to the CA selector of the position initiating the hold if the call on hold was answered with the CA selector.

h. The AVN must, upon receipt of appropriate call disconnect signaling from the trunk or circuit interface bearing a call on hold, release the call and end the holding state.

i. The AVN must permit any position to retrieve any non-OVR call on hold by seizing the circuit via IA (or DA, if assigned) regardless of which operator position originally placed the non-OVR call on hold.

j. The AVN must, upon retrieval of a non-IC call on hold, restore the call audio and the visual indication of active call at the retrieving position and busy call indication at all other positions having a DA selector assigned to the call).

k. The AVN must maintain calls on hold until they are retrieved or released, whichever comes first.

l. The AVN must retain a call's position placed on hold in the CA queue until the call is released.

m. The AVN must move an IA call placed on HOLD to the CA queue providing that a CA queue space is currently available.

n. The AVN must deny call hold request if the CA queue is full and give the appropriate notification to the operator position.

o. The AVN must allow the position operator to resume a call on HOLD by a single touch action to the call designator for the desired call.

p. The AVN must disconnect any position active call that may be in progress when a call is resumed from the HOLD state.

q. The AVN must allow the position operator to select any call from the CA queue without affecting the any other calls in the CA queue that are unanswered or on HOLD.

3.1.2.2.7.2 Conference Calling

a. The AVN must allow any position operator to initiate and participate in conference calls up to the conference limit.

b. The AVN must provide resources for establishing conferences initiated through both DA and IA activation.

c. The AVN must permit up to 25 simultaneous conferees per conference.

d. The AVN must permit at least 32 simultaneous conferences of all types.

e. The AVN must permit the position operator to establish conference calls with IC and Interphone parties.

f. The AVN must connect all conference participants to enable them to converse with each other.

g. The AVN must provide three types of conference: progressive conferencing, meet-me conferencing, and preset conferencing.

h. The AVN must provide access to conferencing capabilities at an operational position as defined and limited by classmarks in the position map(s) for the position.

i. The AVN must allow operator positions to join conference calls via both DA and IA.

j. The AVN must, upon addition of each new party to a conference call, provide a momentary audible indication to all operator positions and Interphone G/G interfaces participating in the conference.

k. The AVN must, upon each attempt to access a trunk from a conference , that is in use and that has been designated private by classmark, reject the call attempt and provide busy tone to the attempting position.

l. The AVN must, upon each attempt to access a trunk or circuit from a conference that is in use, and that has not been designated private by classmark, immediately connect the attempting operator to the circuit such that the attempting operator can hear all other parties and be heard by all other parties on the circuit.

m. The AVN must, throughout each conference call, provide a visual indication of active call at the conference call selector of the originating position.

n. The AVN must provide IC conferees an indication that an incoming call is a conference call prior to answering the call.

o. The AVN must permit local conference participants to place the conference on hold, which must have the effect of removing the participant from the conference temporarily without releasing the conference, such that all remaining conference participants may continue to converse.

p. The AVN must permit any participant in a conference call to release from the conference call at any time, without affecting the continued participation in the conference by any other operational position.

q. The AVN must, for any type conference, provide an audio and a visual indication to any position operator attempting a conference when no system conference resources are available.

r. The AVN must provide audio ringback to the originator of a progressive or preset conference and terminate ringback when any one conferee answers the call.

s. The AVN must provide the capability for any participant in a conference call to suspend participation in the conference call by activation of the HOLD function at the position.

t. The AVN must provide momentary audio and visual indication to the operator whenever the operator attempts to add a call beyond the conference limit.

3.1.2.2.7.2.1 Meet-Me Conference

a. The AVN must, when a meet-me conference is active, provide any non-participating position with a DA for the conference an appropriate circuit-in-use indicator.

b. The AVN must provide a conference bridge, or equivalent, with the feature that any operational position, up to the conference limit accessing the bridge becomes party to any conference on the bridge.

3.1.2.2.7.2.2 Progressive Conference

a. The AVN must establish progressive conferencing by adding positions to the conference as they are identified and connected.

b. The AVN must, throughout each conference call, provide a visual indication of active call at the conference call selector of the originating position.

c. The AVN must provide the capability for authorized operational positions to initiate progressive conferences by a single touch action or by entering an appropriate IA function code sequence, or both.

d. The AVN must, upon activation of the DA selector for progressive conference, permit the position operator to add G/G participants via the contact list.

e. The AVN must, upon activation of the DA selector for progressive conference, permit the position operator to add G/G participants progressively up to the conference limit.

f. The AVN must permit the conference originator to release all conference participants at once with a single touch action.

g. The AVN must permit all non-OVR IA and non-OVR DA calls initiated at the operational position where the conference function is enabled, and answered by the called positions to become participants in the conference call.

h. The AVN must, after the operator selects a conferee via DA or IA, permit the originator to select the next DA or IA conferee without waiting until the previous conferee has answered.

i. The AVN must, upon the addition of each new party to a conference call, provide a momentary audible indication to all positions and Interphone G/G circuits participating in the conference.

j. The AVN must permit the conference originator to cancel any selected conferee who has not yet answered the call.

k. The AVN must, for progressive conference calls, terminate the call attempt to any party that does not answer within a configurable timeout period of 0 to 60 seconds in 1 second increments.

l. The AVN must, for progressive conference calls, provide an indication to the conference initiator when the conference limit is reached.

3.1.2.2.7.2.3 Preset Conference

a. The AVN must provide for automatically signaling designated positions including automatic dialing to establish a preset conference.

b. The AVN must, upon activation of the DA for any preset conference, ring all preset conference participants (other than the originator) following the procedures appropriate for each type of call.

c. The AVN must provide for the identification and inclusion of preset conferences in an operational position's configuration map(s)

d. The AVN must prohibit modification of the preset conferee list by the position operator.

e. The AVN must permit initiation of a preset conference by DA only.

f. The AVN must permit each called party, up to the NVS conference limit, to join the conference by answering the call.

g. The AVN must, for preset conference calls, terminate the call attempt to any party that does not answer within a configurable timeout period of 0 to 60 seconds in 1 second increments.

3.1.2.2.7.3 Call Forwarding

a. The NVS must provide a call forwarding function that causes all subsequent calls destined for the forwarding operator position to be forwarded to the selected position (hereafter referred to as the "forwarded-to operator position").

b. The AVN must permit the call forwarding function to be enabled by entry of an IA code at the operator position.

c. The AVN must permit the call forwarding function to be enabled by activation of a DA selector assigned for that purpose at the operator position.

d. The AVN must provide a visual indication at the forwarding operator position, whenever call forwarding is in effect at the operator position.

e. The AVN shall permit all A/G functions at the operator position to continue when call forwarding is enabled.

f. The NVS must, when call forward is in effect, provide a continuous visual indication at each forwarding operator position of the next and the last position in the chain to which calls have been forwarded.

g. The NVS must, while call forwarding is in effect at any operator position, prohibit loop closure.

h. The NVS must, subject to loop closure restrictions, permit call forwarding function to be enabled between any NVS operator positions.

i. The AVN must permit the forwarding destination to be designated by a single touch action to a DA selector for the destination operator position.

j. The AVN must permit the forwarding destination to be designated by entering the address for the appropriate destination operator position.

k. The AVN must, as configured by authorized personnel, provide a call forward destination entry timer.

l. The AVN must permit the call forward destination entry timer to be configurable from 1 to 60 seconds in 1 second increments.

m. The AVN must, when no forwarding destination is designated within the call forward destination entry timer defined for the operator position, discontinue the call forward attempt.

n. The AVN must, when call forward function is enabled and any other G/G function is selected at the operator position prior to entering the call forward destination, discontinue the call forward attempt.

o. The AVN must, whenever the attempt to enable call forwarding cannot be completed due to an error in entry, discontinue the attempt and provide an error indication to the operator position attempting to forward calls.

p. The AVN must prohibit call forwarding of more than 250 operator positions to a single operator position.

q. The NVS must, whenever the attempt to enable call forwarding cannot be completed because the forwarded-to operator position will have more than 250 operator positions forwarded to it, discontinue the attempt and provide an error indication to the operator position attempting to forward calls

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<#>The AVN must permit the forwarding at a position to be disabled by authorized personnel by dialing an appropriate IA code.¶
<#>The AVN must permit the forwarding position operator to disable call forwarding by deactivation of the call forward DA selector.¶
<#>The AVN must permit all A/G functions at the operational position to continue when call forwarding is enabled.¶
<#>The AVN must, subject to loop closure restrictions, permit the call forwarding function to be enabled between any operational positions within the facility.¶

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r. The AVN must, when call forwarding is not completed, provide an audible and unique visual error indication for each error condition.

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t. The NVS must, subject to loop closure restrictions, allow call forwarding to an operator position that has call forwarding already in effect.

u. The NVS must, subject to loop closure restrictions, permit any operator position to forward its own calls, while it has calls forwarded to it from any other position.

v. The NVS must, when call forwarding at any operator position, permit outgoing calls to be placed from the forwarding position.

w. The AVN shall, when call forwarding is in effect at any operator position, permit outgoing calls to be placed from any operator position in the call forwarding chain

x. The NVS must, when call forwarding chaining is employed, direct the call(s) to the last operator position in the chain, rather than the next position.

y. The AVN must, as controlled by classmark, provide the authorized personnel an indication, when an operator position enables and disables call forwarding.

z. The AVN must provide a continuous visual indication at the forwarded-to operator position whenever calls are forwarded to it.

aa. The AVN must provide a continuous indication at the forwarded-to operator position to identity all positions having calls forwarded to it.

bb. The AVN must, at the last operator position in a call forward chain, provide a chime or voice alert on a circuit if any operator position in the call forward chain is configured for chime or voice alert on the circuit.

cc. The AVN shall permit disabling of call forwarding at an operator position by dialing an IA code.

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dd. The AVN shall permit disabling of call forwarding at an operator position by deactivation of a call forwarding DA selector.

ee. The NVS shall permit the forwarding of any operator position to be enabled by authorized personnel.

ff. The NVS shall permit the forwarding of any operator position to be disabled by authorized personnel.

3.1.2.2.7.4 Monitoring of Other Positions

a. The NVS must permit access to operator position voice monitoring at designated positions, as defined by classmark.

b. The NVS must permit each operator position to simultaneously monitor at least nine other positions.

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c. The NVS must permit authorized personnel to define, for each operator position, the audio provided to all other positions monitoring the position.

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d. The NVS must permit authorized personnel to define, for each operator position, that A/G audio is provided to all other positions monitoring the operator position.

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e. The NVS must permit authorized personnel to define, for each operator position, that non-OVR G/G audio is provided to all other positions monitoring the position.

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f. The NVS must permit authorized personnel to define, for each operator position, that OVR G/G audio is provided to all other positions monitoring the operator position.

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g. The NVS must permit authorized personnel to define, for each operator position, that all audio not associated with A/G or G/G calls is provided to all other positions monitoring the operator position.

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h. The AVN must permit DA position voice monitoring to be provided by a single touch action to an appropriately marked and classmarked latching DA designator.

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i. The AVN must permit IA position voice monitoring to be provided, position classmark permitting, by entering the position voice-monitoring function code, then entering the IA code of the position to be monitored.

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j. The AVN must permit each operator position to monitor any other position by using a monitor DA selector, assigned by reconfiguration, followed by entry of the IA code of the operator position to be monitored.

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k. The NVS must, ensure that voice monitoring of any operator position by any other operator position, in no way alter or degrade A/G or G/G communications at the monitored operator position.

l. The ANV monitoring must include all audio from the monitored operator position's HS jack, and all audio to the monitored operator position's HS jack.

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m. The NVS must permit authorized personnel to define, for each operator position, whether the LS audio is provided to all other positions monitoring the operator position.

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n. The NVS must, regardless of the effects of the Automatic Transfer of A/G Audio to LS during G/G Call Feature, ensure that A/G audio continues to be provided to all other positions monitoring the operator position.

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o. The NVS must prohibit all audio from the monitoring position to the monitored operator position.

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p. The AVN must ensure that the operator position being monitored receives no visual, audible, or other indication that the operator position is being monitored.

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q. The NVS must permit authorized personnel to enable, for each operator position, a privacy feature whereby operator position audio cannot be monitored by other positions .

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r. The NVS must permit authorized personnel to disable, for each operator position, a privacy feature whereby position audio cannot be monitored by other positions.

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s. The AVN must, during monitoring, at the monitoring position, provide a distinct visual indication that monitoring is in progress.

t. The NVS must, during monitoring, at the monitoring position, provide the designation of the operator positions being monitored.

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u. The AVN must provide a visual indication only to operator positions designed by classmark to receive such indication that the operator position is being monitored.

3.1.2.2.7.4.1 Voice Monitor Suspension

a. The AVN must suspend position voice monitoring if the monitoring position performs any of the following actions:

(1) The AVN must suspend position voice monitoring if the monitoring position initiates any A/G communications utilizing PTT.

(2) The AVN must suspend position voice monitoring if the monitoring position initiates any G/G communications.

(3) The AVN must suspend position voice monitoring if the monitoring position answers any non-OVR G/G communication.

(4) The AVN must suspend position voice monitoring if the monitoring position enables the A/G LS transfer function, as controlled by position classmark. See section 3.1.2.3.14.6 for definition of A/G LS transfer function.

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b. The AVN must suspend position voice monitoring, classmark permitting, if position voice monitoring is initiated while a position is overridden.

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c. The AVN must resume position voice monitoring, if selected, after termination of the communication or action causing the suspension.

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d. The AVN must permit position voice monitoring to continue (without suspension) when the monitoring position receives an incoming A/G call.

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e. The AVN must, while voice monitoring is suspended, mute the monitored position's audio and provide a visual indication to the monitoring position operator that voice monitoring is suspended.

f. The AVN must, upon connection to an incoming OVR call at the monitoring position, if the monitoring position is classmarked to mute monitor on OVR connections throughout the OVR connection, mute the monitored audio to the monitoring position; and provide visual indication that monitoring is suspended.

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g. The AVN must, upon release of any G/G call or A/G PTT at the monitoring position during position monitoring, resume position monitoring as previously established, only if monitoring is classmarked to be suspended.

h. The AVN must, when the automatic A/G LS transfer function is enabled at a position, suspend all voice monitoring at the position.

i. The AVN must, when the automatic A/G LS transfer function is disabled at a position, resume all voice monitoring at the position.

j. The AVN must ensure that voice monitors already suspended, when the automatic A/G LS transfer functions is enabled, remain suspended when the function is disabled.

k. The AVN must ensure that when voice monitors are suspended, when the automatic A/G LS transfer function is enabled are resumed, when the function is disabled, unless a call is initiated or in progress at the position.

l. The AVN must ensure that when voice monitors are suspended when the automatic A/G LS transfer function is enabled are resumed when the function is disabled, unless the position is being overridden and the facility is classmarked for voice monitor suspend on override.

m. The AVN must prohibit a voice monitor to be placed on hold, except as described in (b) .

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n. The AVN must, whenever monitoring is active at any operator position, route any incoming A/G calls intended for that position in accordance with 3.1.2.3.14.

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o. The AVN must permit authorized personnel to enable, for each operator position, the mixing of tones generated locally by the monitored position(s) into the monitored voice audio stream.

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p. The AVN must permit authorized personnel to disable, for each operator position, the mixing of tones generated locally by the monitored position(s) into the monitored voice audio stream.

q. The AVN must permit the position operator to individually terminate each active voice-monitoring selection.

r. The AVN must terminate all active voice monitoring selections when the monitoring position becomes inactive.

s. The AVN must, when the monitored operator position is operating in position split mode, provide only the A/G voice communications directed to and emanating from the headset plugged into the A/G HS jack module at the monitored position.

t. The AVN must provide no indication to the monitoring position that the monitored position is in split functionality mode.

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3.1.2.2.7.4.2 Voice Monitor Loop Closure

a. The AVN must provide internal controls to prevent loop closure of voice monitored positions.

b. The AVN must preclude an operator position to establish a voice monitor that would result in the position being monitored by itself due to voice monitor chaining.

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c. The NVS must, when an operator position that is being monitored attempts to initiate a voice monitor to another operator position that already has an active voice monitor, disallow the monitor request and provide the position operator a visual indication stating that the voice monitor is not allowed due to monitor loop closure constraints.

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d. The NVS must, when an operator position that has an active voice monitor is overridden by another position, ensure that the overriding position does not hear the overridden position's monitor audio, thus preventing audio loop closure.

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3.1.2.2.7.4.3 Voice Monitor Through Reconfiguration

a. The AVN must, when the monitoring position's logical identity is changed through a reconfiguration, automatically terminate any voice monitor initiated by that position.

b. The AVN must, when the monitored operator position becomes unassigned through a reconfiguration, automatically terminate any voice monitor of that position.

c. The AVN must, if the monitored operator position is logically reconfigured, retain any established voice monitors,

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d. The AVN must, as a result of a logical to physical reconfiguration in which the logical source and/or the logical destination are physically move, but the logical identity is not changed retain the voice monitor.

e. The AVN must, if a position's G/G or IA voice monitoring classmark is removed through reconfiguration, automatically terminate all voice monitoring by that position.

3.1.2.2.7.5 Incoming Call Chime

a. The AVN must provide an audible chime device integrated with each position to alert the operator of incoming G/G calls.

b. The AVN must provide the chime device audio to the position operator through the position G/G loudspeaker.

c. The AVN must provide at least 50 choices of chime tone character, selectable by the operator, or by authorized personnel.

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d. The AVN must control the selection of one of the ten different chime tones at the position.

e. The AVN must permit the operator to turn the chime on and off at each position.

f. The AVN must provide visual indication at the position whenever the chime has been turned off.

g. The AVN must provide the chime off indication independent of the visual indications provided for incoming calls.

h. The AVN must provide a combination on/off and volume control at each position.

i. The AVN must provide a visual on/off status chime indicator collocated with the chime device.

j. The AVN must permit the operator at each position to adjust individually the volume of the chime, independent of other volume levels.

k. The AVN must provide a minimum and maximum chime volume setting, adjustable AVN by position operator.

l. The AVN must permit adjustments to the chime volume control without affecting the volume level of the LS, so that the chime volume maybe lower than the LS volume

m. The AVN must prohibit chime sound through the HS.

n. The AVN must prohibit the recording of chime on the legal voice recorder.

o. The AVN must couple the chime volume control and the LS volume control in such a way that the chime volume remains discernibly below the LS volume when the LS volume control is adjusted up or down.

3.1.2.2.7.6 Hook Flash

a. The AVN must provide a non-latching DA selector for hook flash at each position as designated by authorized personnel.

b. The AVN must, when the hook flash selector at the position is activated, provide an appropriate hook flash signal to the trunk/circuit interface bearing the G/G call in progress.

c. The AVN must ensure that the hook flash selector at the position has no effect if activated during a call on a trunk or circuit that does not accept hook flash signaling.

d. The AVN must ensure that the hook flash selector at the position has no effect if activated while no G/G calls are in progress.

3.1.2.2.7.7 Manual Ringdown

e. The AVN must provide a non-latching DA selector for manual ring at each position as designated by authorized personnel during reconfiguration.

f. The AVN must, when the manual ring selector is activated, provide an appropriate re-ring signal to the trunk/circuit interface bearing the G/G call in progress.

g. The AVN must ensure that the manual ring selector has no effect if activated during a call on a trunk or circuit that does not accept manual ringdown signaling.

h. The AVN must ensure that the manual ring selector has no effect if activated while no G/G calls are in progress.

3.1.2.2.7.8 A/G-G/G Coupling

a. The AVN must provide an A/G-G/G coupling feature that is available to the operator regardless of which receiver audio routing option is selected for the radio interface involved in the A/G-G/G coupling.

b. The AVN must assign a DA selector for A/G-G/G coupling at each position, as designated by classmark.

c. The AVN must, upon activation of the A/G-G/G coupling selector, route incoming audio from all A/G receivers selected at the position to the G/G call (including conference calls) active at the position.

d. The AVN must, with A/G-G/G coupling enabled and while PTT is active at any position on the A/G frequencies involved in the A/G-G/G coupling, route the outgoing audio for those frequencies to the coupled G/G call at the position.

e. The AVN must, upon activation of the A/G-G/G coupling selector, provide a visual indication on the A/G-G/G coupling selector that A/G-G/G coupling is enabled.

f. The AVN must, while A/G-G/G coupling is active, allow the initiating position to disable and enable radios (e.g., Tx, Rx and M/S), including radios selected at the time coupling was initiated.

g. The AVN must, while A/G-G/G coupling is active, allow the initiating position to alter selection of coupled radios.

h. The AVN must, while A/G-G/G coupling is active, provide the initiating position a visual indication of active call at the A/G-G/G coupling selector.

i. The AVN must, when A/G-G/G coupling is active, permit the coupling position and G/G caller to converse in a conference mode.

j. The AVN must, upon deactivation of the A/G-G/G coupling selector, withhold A/G receiver audio from the G/G call and extinguish the A/G-G/G coupling active indication.

k. The AVN must prohibit the transmission of audio from the G/G circuit over A/G frequencies as a result of A/G-G/G coupling being engaged.

l. The AVN must, while A/G-G/G coupling is active, permit the operator to place the coupled G/G call on hold.

m. The AVN must, while the coupled G/G call is on hold, permit the coupled G/G call to remain coupled to the active frequencies at the position.

n. The AVN must, while the coupled G/G call is on hold, remove the coupling position audio to the coupled G/G call, unless the position transmits on any of the coupled frequencies.

o. The AVN must, while the coupled G/G call is on hold, permit the position operator to place or answer other G/G calls without affecting the coupled G/G call.

p. The AVN must, while A/G-G/G coupling is in effect and the coupled G/G call is released, withhold A/G receiver audio from the G/G call and extinguish the A/G-G/G coupling active indication.

3.1.2.2.7.9 Speed Dial

a. The AVN must, as designated by authorized personnel, provide speed dial capability equal to the maximum number of DA selectors assignable at each position.

b. The AVN must permit the position operator to access speed dial codes via IA up to the maximum number of speed dial codes defined within the AVN's electronic contact list.

c. The AVN must allow authorized personnel to assign at least 40 alphanumeric characters (including the "#" and "*" characters) to each speed dial dialing sequence during reconfiguration.

d. The AVN must allow authorized personnel to configure at least 999 separate speed dial definitions without requiring position operator action.

e. The AVN must allow authorized personnel to edit any speed dial definitions without requiring position operator action.

f. The AVN must allow authorized personnel to delete any speed dial definitions without requiring position operator action.

g. The AVN must permit the addition of network elements (addresses) to speed dial codes.

h. The AVN must permit a speed dial selector to access individual G/G circuit and dial stored characters.

i. The AVN must permit a speed dial selector to access individual trunk group(s) and dial stored characters.

3.1.2.2.7.10 Call Transfer

a. The AVN must transfer calls using a three-step process wherein the transferring operator manually selects the transfer feature, then places a call to a second (transferred-to) position, and manually releases the call.

b. The AVN must provide call transfer feature for all non-OVR IC calls.

c. The AVN must provide call transfer feature for all non-OVR Interphone calls

d. The AVN must permit call transfer to be initiated through activation of a DA selector designated for call transfer.

e. The AVN must permit call transfer to be initiated through entry of the IA code for call transfer using the IA keypad.

f. The AVN must permit the position operator to select a call transfer destination by a single touch action to a DA designator for the destination position.

g. The AVN must permit the position operator to select a call transfer destination by entering the destination position number on the IA keypad.

h. The AVN must permit the position operator to select a call transfer destination by entering the destination via the electronic contact list.

i. The AVN must provide the position operator a continuous visual indication that the transfer function is enabled.

j. The AVN must, when the call transfer feature is initiated, prohibit the initiating operator from hearing audio until such time as call transfer is completed or cancelled.

k. The AVN must allow transfer of only the active non-OVR G/G call in progress to a designated position.

l. The AVN must, when the call transfer function is enabled, permit the transferring position operator to establish a call to the transferred-to position.

m. The AVN must, when call transfer is complete, remove transferring position from the connection; and establish a normal G/G call between the calling party and the transferred-to position.

n. The AVN must, when the transferred-to position operator answers, permit the transferring position operator to release the call to the transferred-to position without affecting the connection between the original calling party and the transferred-to position.

o. The AVN must provide the initiating position operator an audible indication when an attempt is made to transfer a call that does not support call transfer.

p. The AVN must provide an audible indication to the initiating operator when an invalid destination position has been entered on the IA keypad.

q. The AVN must permit call transfer to be cancelled by the transferring operator by selecting an already active call transfer DA function selector.

r. The AVN must permit call transfer to be cancelled by the transferring operator by entering the IA call transfer cancel function code.

s. The AVN must terminate the call transfer function, if no transferee is designated by the position operator within 10 seconds after call transfer function initiation.

t. The AVN must terminate the call transfer function, if the call is released.

u. The AVN must terminate the call transfer function, if any other G/G function is selected by the position operator.

v. The AVN must maintain the active call at the position if no transferee is designated within 10 seconds of initiating the call transfer function.

w. The AVN must, when the transferred-to position operator answers and the call is classmarked as private, automatically disconnect the transferring position audio connection from the transferred-to position.

x. The AVN must, when the transferring position is automatically disconnected, terminate the call transfer function and remove all call transfer indications from the transferring position display.

y. The AVN must, when a call transfer is executed, transfer the call to the transferred-to position's DA selector for the calling party; if one exists.

z. The AVN must, when a call transfer is executed, transfer the call to the transferred-to position's CA queue; if no DA selector is assigned for the calling party.

aa. The AVN must, if transfer-to position is not operational, provide the initiating position operator an alert and prohibit the call transfer attempt.

3.1.2.2.7.11 Call Mute

a. The AVN must provide a latching selector at any or all positions to allow muting of outgoing non-OVR G/G audio as designated by authorized personnel.

b. The AVN must provide non-latching selector at any or all positions to allow muting of outgoing non-OVR G/G audio as designated by authorized personnel.

c. The AVN must preclude enabling of the mute function unless a non-OVR G/G call is in progress.

d. The AVN must preclude enabling of the mute function for non-OVR calls placed or answered with a non-latching selector at each operator position.

e. The AVN must preclude muting of outgoing audio for OVR G/G calls at each operator position.

f. The AVN must preclude passing the inbound OVR call audio to any other party on a muted connection when an inbound OVR G/G call is in progress at a position with mute enabled.

g. The AVN must preclude muting of outgoing A/G audio at each operator position.

h. The AVN must automatically disable the mute function when the non-OVR G/G call is disconnected.

i. The AVN must provide a continuous visual indication at each operator position of the call mute selection in effect.

3.1.2.2.7.12 Audible Alert Enable/Disable

a. The AVN must permit authorized personnel to assign a single DA selector to any position to enable incoming call alerting.

b. The AVN must permit authorized personnel to assign a single DA selector to any position to disable incoming call alerting.

c. The AVN must permit each position to enable audible incoming call alerting with a single touch action to the assigned Audible DA Enable/Disable selector and then a touch to the designated DA.

d. The AVN must permit each position to disable audible incoming call alerting with a single touch action to the assigned Audible DA Enable/Disable selector and then a touch to the designated DA.

e. The AVN must ensure that the visual indication of the call Audible Alert state on each DA is current.

3.1.2.2.7.13 Electronic Contact List

a. The AVN must provide a contact list directory database that includes at least the following elements for a single AVN:

(1) The AVN must provide a contact list directory database that includes all direct access selector assignments by DA name.

(2) The AVN must provide a contact list directory database that includes all indirect access assignments by IA code.

(3) The AVN must provide a contact list directory database that includes all speed dial assignments.

(4) The AVN must provide a contact list directory database that includes all logical operator positions by position name.

(5) The AVN must provide a contact list directory database that includes all G/G circuits by circuit name.

(6) The AVN must provide a contact list directory database that includes all trunk groups by trunk group name.

(7) The AVN must provide a contact list directory database that includes all preset conferences by preset conference name.

(8) The AVN must provide a contact list directory database that includes all meet-me conferences by meet-me conference name.

(9) The AVN must provide a contact list directory database that includes all progressive conferences by progressive conferences name.

b. The AVN must permit entry of at least 40 alphanumeric characters for all directory database elements.

c. The AVN must automatically update entries in the contact list directory database as changes are made to site's database.

3.1.2.2.7.13.1 Position Contact List Operation

a. The AVN must provide a latching DA selector at each position as designated by authorized personnel.

b. The AVN must provide an IA code to activate the position contact list feature.

c. The AVN must, when the contact list selector is activated, display the site's contact list.

d. The AVN must, when the contact list is displayed, ensure that incoming call alerting is visible at the position.

e. The AVN must, when the contact list is displayed at a position and a call is placed from the contact list, remove/close the contact list from the position display.

f. The AVN must, when the contact list is displayed at a position and any other function is selected, with the exception of progressive conference, remove/close the contact list from the position display.

g. The AVN must, when the contact list is displayed at a position and the progressive conference function is active, ensure that the contact list remains displayed until closed by the operator.

h. The AVN must provide position controls to search the position contact list.

i. The AVN must, at a minimum, permit the contact list to be searched by first letter in the entry.

j. The AVN must, at a minimum, permit the contact list to be searched by scrolling through entries.

k. The AVN must, when the contact list is displayed at a position, permit call placement to the selected destination within the contact list display.

l. The AVN must, when the contact list is displayed at a position, permit removal/close of the contact list from the display by a single touch to the electronic contact list DA selector.

m. The AVN must, when the contact list is displayed at a position, provide a "Close" button as a part of the contact list display to permit the operator exist the feature.

n. The AVN must prohibit editing of the contact list at the position.

3.1.2.2.7.14 System Call Progress Tones

a. The AVN must provide call progress tones (e.g., dial tone, busy tone, ringback tone) in accordance with section 7.3 of ANSI/TIA-464C, with the following exceptions:

(1) The AVN must supply the following Reorder Tone cadence and tolerance:

(a) The AVN must provide a Recorder Tone OFF duration of 250 ms +25/-50 ms (range of 200 to 275 ms)

(b) The AVN must provide a Recorder Tone ON duration of 250 ms +25/-50 ms (range of 200 to 275 ms)

(2) The AVN must supply, at each operational position, the following tone levels:

(a) The AVN must provide dial tone and zip tone (combined 350 Hz and 440 Hz tones): -9 dBm0 to -10 dBm0 combined.

(b) The AVN must provide reorder and busy tone (combined 480 Hz and 620 Hz tones): -19 ± 1.5 dBm0 per frequency.

(c) The AVN must provide audible ring tone (combined 440 Hz and 480 Hz tones): -15 ±1.5 dBm0 per frequency.

(d) The AVN must provide Receiver-off-hook (ROH) tone: -9 dBm0 Intercept Tone.

3.1.2.3 Operational Position Controls and Features

3.1.2.3.1 Direct Access Selectors

3.1.2.3.1.1 Functions of DA Selectors

a. The AVN must, at each position, provide direct access selectors that may be assigned to place IC calls.

b. The AVN must, at each position, provide direct access selectors that may be assigned to seizure of external circuits for Interphone or other external G/G calls.

c. The AVN must, at each position, provide direct access selectors that may be assigned for the activation of special functions.

3.1.2.3.1.2 DA Selector Identification

a. The NVS must permit each DA selector to simultaneously display at least 5 rows of alphanumeric characters.

b. The NVS must permit each DA selector to simultaneously display at least 22 alphanumeric characters.

(1) The NVS must use row 1 for status information presentation.

(2) The NVS must permit rows 2, 3 and 4 each to contain up to 6 alphanumeric characters.

(3) The NVS must permit row 5 to contain up to 4 characters.

c. The AVN must permit the assignment of DA selector identification to be electronically programmable on the position display as a result of reconfiguration.

d. The AVN must, whenever a function of a DA selector is changed through reconfiguration, automatically change the associated display to reflect the new function.

e. The AVN must, for DA selectors with no current assignment, show as blank or not be displayed.

3.1.2.3.1.3 DA Selector Visual Displays

a. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for idle.

b. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for ringing.

c. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for active.

d. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for in-use.

e. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for busy.

f. The AVN must, on DA selectors assigned for the placement of G/G calls, provide a continuous and unique visual indication of the state of their assigned calls, or circuits, for hold.

g. The AVN must, on DA selectors assigned for the activation of special functions, provide a continuous and unique visual indication of the state of their assigned function.

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h. The AVN must provide a continuous and unique visual indication of the type of call being placed by DA selector(s) assigned for the activation of calls.

i. The AVN must, for incoming calls, provide a visual indication that the audible alert feature is enabled on each DA selector having that choice.

j. The AVN must, for incoming calls, provide a visual indication that the audible alert feature is disabled on each DA selector having that choice.

3.1.2.3.1.4 Latching/Non-Latching DA Selectors

a. The AVN must permit each DA selector at an operational position to be assigned a classmark designating the selector as either latching or non-latching.

b. The AVN must ensure that a latching DA selector requires a single touch action to activate the selector.

c. The AVN must, for a latching DA selector, ensure that a second touch action or other call release action is required to deactivate the selector.

d. The AVN must ensure that a non-latching DA selector requires a continuous touch action to initiate and maintain activation of the selector.

e. The AVN must, for non-latching DA selectors, ensure that the cessation of touch deactivates the circuit.

f. The AVN must provide a continuous visual indication showing that a selector is latching or is non-latching.

g. The AVN must ensure that the activation of a non-latching selector activates the position microphone for the duration of the touch action.

3.1.2.3.1.5 Number of DA Selectors

a. The AVN must provide a display of at least 200 DA communication selectors at each operational position.

b. The AVN must, in the position configuration map(s) for each position, control the assignment of the DA selectors, their functions, and limitations.

c. The AVN must allow a minimum of 80 assigned DA selectors, to be immediately available for selection at any time via single touch action.

d. The AVN must allow all assigned DA selectors to be available via two-touch action.

e. The AVN must define in the configuration map(s), the DA assignments at a given operational position.

3.1.2.3.2 IA Keypad

3.1.2.3.2.1 IA Keypad Layout

a. The AVN must provide an IA keypad at each position.

b. The AVN must provide an IA keypad that is presented on the position touch entry display.

c. The AVN must provide at the position an IA keypad that provides a standard 12 button telephone keypad with a 3 by 3 plus 1 numeric matrix with the zero digit centered on the bottom row between '*' and the '#' symbols or electronic emulation thereof for the purpose of entering call address digits and other data.

d. The AVN must provide at the position an IA selector for the purpose of initiating IA calls.

e. The AVN must provide at the position a call release selector for the purpose of releasing IA and DA calls.

f. The AVN must provide at the position an IA keypad that includes a backspace pushbutton for correcting erroneous entries.

g. The AVN must provide at the position a common answer (CA) selector for the purpose of answering calls.

h. The AVN must provide at the position an incoming IA OVR call indicator.

i. The AVN must provide at the position an IA keypad alphanumeric display that is visible under all ambient light conditions in the control room areas.

j. The AVN must provide at the position an IA keypad alphanumeric display that provides at least two rows of at least 20 characters each.

k. The AVN must provide at the position an IA keypad with an output function that includes visual feedback of number sequences, function sequences, error and status messages to the position operator.

l. The AVN must ensure, if the keypad is not presented on the display device at the position, that the call initiation and release pushbuttons are translucent and continuously trans-illuminated.

m. The AVN must ensure that the call initiation and release buttons at the position are placed above the numeric keypad at a distance from the numeric keypad greater than that between rows of the numeric keypad.

n. The AVN must, when a physical keypad is used at the position, ensure that the "5" key has a distinct indication/feel to reflect a "home" position.

o. The AVN must ensure that the 12-key pushbuttons at the position are trans-illuminated when the IA keypad is active for input.

p. The NVS must use distinct colors to indicate the functionality of the pushbuttons at the position.

q. The AVN must provide a brightness control mechanism for the pushbutton backlighting for the operator's use.

r. The AVN must provide an IA keypad device or an electronic emulation thereof at the position with maximum dimensions of three inches wide by five and one-half inches deep by one and three-quarters inches high.

s. The AVN must, if there is no physical IA keypad device is connected at the position, ensure that the electronic IA Keypad is automatically displayed when the IA Keypad is required for operator input.

t. The AVN must, if a physical IA Keypad device is connected at the position, ensure that the device is always available to the operator.

u. The AVN must permit authorized personnel to permanently assign an electronic IA keypad on the position display.

v. The AVN must remove the electronic IA keypad from the position display, if the IA keypad is displayed, when the call is released.

w. The AVN must permit the position operator to manually remove the electronically displayed IA keypad.

3.1.2.3.2.2 IA Keypad Visual Displays

a. The AVN must, when the IA keypad is used for G/G communications, provide an IA selector and CA selector that provide a continuous and unique visual indication of “idle”.

b. The AVN must, when the IA keypad is used for G/G communications, provide an IA selector and CA selector that provide a continuous and unique visual indication of “ringing”.

c. The AVN must, when the IA keypad is used for G/G communications, provide an IA selector and CA selector that provide a continuous and unique visual indication of “active”.

d. The AVN must, when the IA keypad is used for G/G communications, provide an IA selector and CA selector that provide a continuous and unique visual indication of “hold”.

e. The AVN must, when the IA keypad is used for G/G communications, provide an IA selector and CA selector that provide a continuous and unique visual indication of “busy”

f. The AVN must provide an IA keypad that displays the digits as entered by the operator.

g. The AVN must, display on the IA keypad, an error message to the position operator whenever the operator enters an unassigned dial code at the IA keypad.

h. The AVN must display on the CA selector when an incoming IA call is an OVR call.

i. The AVN must provide a continuous and unique visual indication of "accepting data", when the IA keypad is used for the entry of data not directly involved with G/G communications exclusive of all other states.

j. The AVN must provide a continuous and unique visual indication of "not accepting data", when the IA keypad is used for the entry of data not directly involved with G/G communications exclusive of all other states.

k. The AVN must provide a continuous and unique visual indication of "error", when the IA keypad is used for the entry of data not directly involved with G/G communications exclusive of all other states.

l. The AVN must, when the IA keypad is used for the entry data not directly involved with G/G communications, ensure that the IA keypad remains active or is displayed until the end of data entry.

3.1.2.3.2.3 IA Keypad Entry Error Warning

a. The AVN must provide an audible indication of erroneous input whenever the operator enters an invalid digit or dial code at the IA keypad

b. The AVN must continue the error indication until the initiating operator ends the initiation attempt.

c. The AVN must, when erroneous input is entered, ensure that no function or call connectivity is established.

3.1.2.3.2.4 IA Call Management

a. The AVN must, when the IA Keypad is physically connected or disconnected at a position, release all active or pending G/G calls (IA, CA Queue, DA, and calls in ringback), active voice monitors, and suspended voice monitors at that position.

b. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that any IA Keypad operation or special functions are terminated.

c. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that DA buttons are returned to the idle state.

d. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that the position receives an audible error tone and a warning message.

e. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that incoming override calls, ringing calls, and calls on hold are not affected.

f. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that the A/G LS transfer function is not affected.

g. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that established call forward is not affected.

h. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that position settings (OVR routing, display brightness, tone volume levels are not affected.

i. The AVN must, when the IA Keypad is physically connected or disconnected at a position, ensure that no A/G functionality at the position is affected.

j. The AVN must, when a position is classmarked to have a physically connected IA keypad and one is not connected and the operator selects a DA button that requires the IA Keypad to complete the call, ensure that the DA remains in the active state until the an action is taken to release the active DA, answer or place another call.

3.1.2.3.2.5 Caller Identity Display

a. The AVN must, for incoming calls on trunks/circuits that provide caller identity information to an operational position, decode this information and display it at the IA display, even if call appears as a DA.

b. The AVN must, for an incoming call to an operational position that does not have a corresponding DA selector, display the calling identity information on the CA queue display area of the called position.

c. The AVN must, when call source information is not available, display the line/trunk designator for that incoming call on the CA queue area.

d. The AVN must maintain the position of the Caller IDs displayed in the CA queue area regardless of any changes in the number of calls in the queue.

e. The AVN must display in the CA queue area at least 12 alphanumeric characters in each queue position.

3.1.2.3.3 A/G Frequency Controls and Displays

3.1.2.3.3.1 A/G Frequency Controls

a. The AVN must provide a transmitter select/deselect selector for each A/G frequency assigned to a position.

b. The AVN must provide a transmitter main/standby selector for each A/G frequency assigned to a position.

c. The AVN must provide a receiver select/deselect selector for each A/G frequency assigned to a position.

d. The AVN must provide a receiver main/standby selector for each A/G frequency assigned to a position.

e. The AVN must provide a per-frequency HS/LS routing selector for each A/G frequency assigned to a position.

f. The AVN must provide a remote mute selector for each A/G frequency assigned to a position that has remote mute signaling provided at the radio interface.

g. The AVN must, at each position, permit the selection of non-emergency frequency transmitters, up to the maximum number of non-emergency transmitters assigned to the position.

3.1.2.3.3.2 A/G Frequency Displays

a. The AVN must, for individual frequency displays, indicate the frequency value, site designator if multiple sites for a frequency are used, and the selected routing (HS or LS) for the frequency.

b. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter not selected and idle.

c. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter not selected and busy.

d. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter selected and idle.

e. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter selected and active.

f. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter selected and busy.

g. The AVN must, for each transmitter selector, provide a continuous and unique visual indication of the transmitter locked out.

h. The AVN must include PTT confirmation, squelch break, and PTT lockout for individual frequency displays.

i. The AVN must, for those radio interfaces that provide a PTT trunk lockout signal, display a radio interface PTT trunk lockout indication.

j. The AVN must, for frequencies with multiple sites, provide a visual indication of the selected state of the voting algorithm for each site group.

k. The AVN must permit the position operator to select the transmitter site on a call-by-call basis for multiple site frequencies on the frequency status display.

l. The AVN must provide the position operator a continuously visible enabled or disabled cross-coupling status for assigned cross-coupled frequencies for those frequencies selected for use by the position operator.

m. The AVN must, for each transmitter selector as controlled by position classmark, provide a unique and continuous visual indication of the state of shared transmitters at each position.

n. The AVN must, for each receiver selector, provide a continuous and unique visual indication of the receiver not selected and idle.

o. The AVN must, for each receiver selector, provide a continuous and unique visual indication of the receiver not selected and active.

p. The AVN must, for each receiver selector, provide a continuous and unique visual indication of the receiver selected and idle.

q. The AVN must, for each receiver selector, provide a continuous and unique visual indication of the receiver selected and active.

r. The AVN must, for each receiver selector, provide a continuous and unique visual indication of the receiver selected and active but muted.

s. The AVN must, for each receiver selector as controlled by position classmark, provide a visual indication of the presence of voice (i.e., squelch break indication) received from the trunk, regardless of whether the frequency has been selected.

t. The AVN must, for each main/standby selector, provide a continuous and unique visual indication of "main selected" of its assigned transmitter or receiver.

u. The AVN must, for each main/standby selector, provide a continuous and unique visual indication of "standby selected" of its assigned transmitter or receiver.

v. The AVN must, for each per-frequency A/G HS/LS selector, provide a continuous and unique visual indication of its HS routing selected.

w. The AVN must, for each per-frequency A/G HS/LS selector, provide a continuous and unique visual indication of its LS routing selected.

x. The AVN must, at each A/G HS/LS selector, reflect the actual routing in effect, which may be affected by functions other than the selector (e.g., automatic transfer, unattended position).

y. The AVN must permit the position operator to enable and disable the frequency status display.

z. The AVN must display the frequency of the radio equipment to which the selectors have been assigned.

aa. The AVN must display up to14 alphanumeric characters to represent the frequency in megahertz (or other identifier) of the equipment.

bb. The AVN must automatically update the frequency display whenever the assignment of A/G frequency selectors is changed.

3.1.2.3.4 HS Jack Modules

a. The AVN must, as ordered by the government, provide one jack module ("primary" jack module) per position, having Operator and Monitor jack set.

b. The AVN must, as ordered by the government, provide two jack modules per position, having Operator and Monitor jack sets.

c. The AVN must provide jack modules that can accommodate any combination of two headsets or handsets and their associated PTT switches.

d. The AVN must provide jack module sets that accommodate HS instruments having both earpiece and mouthpiece circuits.

e. The AVN must, for each primary and secondary jack module, place the monitor jack set immediately to the left of the operator jack set.

f. The AVN must permit any jack set to be used for all communications functions.

g. The AVN must prohibit position transmit audio from being presented at the position's LS regardless of the selected routing at the position.

h. The AVN must route all HS directed audio from A/G and G/G calls to the earpiece of each jack having a HS device plugged in.

i. The AVN must supply sidetone to any active HS device.

j. The AVN must detect when a HS device has been inserted into a jack module.

k. The AVN must detect when a HS device has been removed from a jack module.

l. The AVN must prohibit HS insertion or removal from generating a false PTT signal.

3.1.2.3.4.1 Multiple Jack Operation

a. The AVN must provide two configurable options for multiple jack operations, paired and parallel.

b. The AVN must ensure that when the "paired" option is selected that the multiple jack operation, PTT and PTT preemption operate as describe in section 3.1.2.3.4.1.1.

c. The AVN must ensure that when the "parallel" option is selected that the multiple jack operation, PTT and PTT preemption operate as describe in section 3.1.2.3.4.1.2.

d. The AVN must ensure that the "Monitor" jack is the preempting jack, regardless of the selected multiple jack operation option.

e. The AVN must ensure that the "Operator" jack is the preemptable jack, regardless of the selected multiple jack operation option.

f. The AVN must preclude reception of the preempted position operator's own voice as sidetone for the duration of the preemption regardless of the selected option.

g. The AVN must provide the transmit audio of the preempting PTT device to all other HS devices connected at the position regardless of the selected option.

3.1.2.3.4.1.1 Paired Multiple Jack Preemption

a. The AVN must, during paired multiple jack operation, perform position preemption in the following order and priority:

(1) The primary jack module's monitor PTT must preempt the primary jack module's operator PTT and the second jack module's PTT (highest priority).

(2) The primary jack module's operator PTT must preempt the second jack module's PTT.

(3) The second jack module's monitor PTT must preempt the second jack module's operator PTT.

(4) The second jack module's monitor PTT must be precluded from preempting the primary jack module's PTT.

(5) The second jack module's operator PTT must have the lowest priority.

3.1.2.3.4.1.2 Parallel Multiple Jack Preemption

a. The AVN must, during parallel multiple jack operation, perform position preemption in the order and priority as described in TABLE 3-1.

b. The AVN must provide PTT preemption priority for the monitor jack on each jack module.

TABLE 3-1. PTT Local Priorities

PTT Switch(es) Activated	Headset (HS) Jack Microphone(s) Enabled
One preemptable	Associated HS Mic
Both preemptable	Both preemptable HS Mics
One preempting	Associated HS Mic
Both preempting	Both preempting HS Mics
One or both preemptable and one or both preempting	One or Both preempting HS Mics
Over non-latching DA only	All HS Mics
Override non-latching DA and one or both preemptable	All HS Mics
Override non-latching DA and one or both preempting	Both preempting HS Mics
Override non-latching DA, one or both preemptable, and one or both preempting	Both preempting HS Mics
A/G Emergency PTT only	Both preemptable HS Mics

PTT Switch(es) Activated	Headset (HS) Jack Microphone(s) Enabled
A/G Emergency PTT only (no HS plugged in to the preemptable jacks)	Both preempting HS Mics
A/G Emergency PTT and one or both preemptable	Both preemptable HS Mics
A/G Emergency PTT and one preempting	Associated preempting HS Mic
A/G Emergency PTT and both preempting	Both preempting HS Mics
A/G Emergency PTT, one or both preemptable, and one Preempting	Associated preempting HS Mic
A/G Emergency PTT, one or both preemptable, and both Preempting	Both preempting HS Mics
Footswitch only	Both preemptable HS Mics
Footswitch only (no HS plugged in to the preemptable jacks)	Both preempting HS Mics
Footswitch and one or both preemptable	Both preemptable HS Mics
Footswitch and one preempting	Associated preempting HS Mic
Footswitch and both preempting	Both preempting HS Mics
Footswitch, one or both preemptable, and one preempting	Associated preempting HS Mic
Footswitch, one or both preemptable, and both preempting	Both preempting HS Mics

3.1.2.3.5 HS Volume Controls

a. The AVN must provide a separate volume control for each HS jack, located in a convenient location for use by the position operator.

b. The AVN must provide a HS volume control that allows the position operator to adjust the audio output level over a range of +16 to -27 dB relative to the transmission level defined for the HS output jack.

c. The AVN must permit the position operator to independently adjust, via the touch entry display, the relative volume for all audible call progress tones, except externally supplied tones.

d. The AVN must permit the position operator to adjust the relative volume of the audible call progress tones over a range of +16 to -27 dB from their nominal value.

e. The AVN must provide HS volume controls for jack modules separate from any located on the touch entry display (TED).

f. The AVN must prohibit the location of HS volume controls on the operator position loudspeaker(s).

3.1.2.3.6 Sidetone

a. The AVN must provide audio sidetone to all (up to four) jacks at a position, for all communications emanating from the position.

b. The AVN must generate sidetone at the position.

c. The AVN must permit the position operator to adjust sidetone.

d. The AVN must permit the position operator to adjust sidetone level range from at least 16 to 28 dB below the audio level provided at the position HS microphone in 5 steps in increments no greater than 3dB.

e. The AVN must provide a sidetone volume control that is independent from all other volume controls.

f. The AVN must provide a separate sidetone volume control for each jack.

g. The AVN must provide the sidetone through the HS.

h. The AVN must prohibit the sidetone from being audible through the position loudspeaker at any time.

i. The AVN must ensure that sidetone contains only the outgoing call audio.

j. The AVN must have a sidetone delay of less than or equal to 20 ms.

3.1.2.3.7 Position Loudspeakers

a. The AVN must provide each position with an option for either one or two separate loudspeakers (LS), as ordered by the Government.

b. The AVN must, by classmark, allow incoming A/G audio to be presented to a A/G loudspeaker and G/G audio to a separate G/G loudspeaker.

c. The AVN must provide a LS of sufficient size and power rating to produce a sustained sound pressure level of 88 dB SPL at a distance of one meter on-axis, when driven by a 1004-Hz test tone.

d. The AVN must provide each LS with a separate volume control, adjacent to the LS, or in another convenient location for use by the position operator.

e. The AVN must prohibit the LS volume control from being located on the LS.

f. The NVS must provide LS that produces 55 dB SPL at a distance of one meter on-axis, when driven by a –12 ± 3dBm0 1004 Hz test tone at the minimum volume setting.

g. The NVS must provide a LS that is audible within at least 8 feet of the position.

h. The AVN must ensure that the LS is not overdriven so as to produce audible distortion.

i. The AVN must ensure that the LS is not overdriven so as to produce audible clipping.

3.1.2.3.8 Footswitch Operation

a. The AVN must provide an interface for a GFE removable footswitch for activation of PTT at each position.

b. The AVN must, when the jack module(s) are operating in parallel mode, permit the footswitch to be used as an alternate PTT device, working in parallel with the HS PTT device when only one HS is plugged in.

c. The AVN must, when the jack module(s) are operating in "parallel mode", and more than one HS is plugged in, ensure that the footswitch operational rules detailed in TABLE 3-1 are enforced.

d. The AVN must, when a HS device is plugged into the monitor jack and another HS device is plugged into the operator jack at the position, permit the footswitch to be used as an alternate PTT device for the operator only, (i.e., in parallel with the operator jack HS PTT device only).

e. The AVN must, when the jack module(s) is operating in "paired" mode, prohibit the footswitch from operating with the second jack module.

3.1.2.3.9 Hand-Held Microphone Operation

a. The AVN must, as ordered by the government, provide each position with a hand-held microphone jack to accommodate a GFE supplied hand-held microphone.

b. The AVN must, when the hand-held microphone device is connected to an operational position, allow it to act in parallel with the HS device connected to the primary jack module's Operator jack.

c. The AVN must, when the hand-held microphone is used alone (i.e., without any HS instruments connected to any jack), transfer all receive audio for the position to the LS, regardless of the state of HS/LS selectors for G/G calls and A/G radio frequencies.

d. The AVN must, when the hand-held microphone is used alone (i.e., without any HS instruments connected to any jack), transfer all receive audio for the position to the LS, and suspend all active voice monitors at that position, regardless of the state of HS/LS selectors for G/G calls and frequencies.

e. The AVN must, when the hand-held microphone is used in conjunction with any other HS instrument , ensure that control of the HS/LS selection is provided in accordance with 3.1.2.3.13.

3.1.2.3.10 Non Split Position Mode Relief Briefing

a. The AVN must provide a position relief briefing feature.

b. The AVN must permit a non-latching selector for relief briefing to be assigned at each position by classmark during reconfiguration.

c. The AVN must permit a latching selector for relief briefing to be assigned at each position by classmark during reconfiguration.

d. The AVN must permit activation of relief briefing by a single touch action of the relief briefing selector.

e. The AVN must, upon activation of the relief briefing selector, establish a two-way audio connection between all HS jacks equipped at the position such that operators plugged into these jacks may converse with each other without activation of PTT.

f. The AVN must provide a continuous visual indication at the position of the active state for the duration of the position relief briefing.

g. The AVN must provide a continuous visual indication at the position of the hold/suspended state for the duration of the position relief briefing.

h. The AVN must in no way restrict access to or operation of A/G or G/G communication functions during position relief briefing.

i. The AVN must, when position relief briefing is active, suspend the position relief briefing audio connections at the position whenever a G/G or A/G call is in progress.

j. The AVN must, when position relief briefing is active, automatically reestablish the position relief briefing audio connections at the position whenever a G/G or A/G call is released.

k. The AVN must, upon deactivation of the relief briefing feature, discontinue the position relief briefing audio connections and extinguish the visual indication of relief briefing in progress.

3.1.2.3.11 Facility Door Release

a. The AVN must provide a non-latching selector for operation of the door release at each position for each facility entry door release interface, as designated by classmark.

b. The AVN must provide a visual indication at each position of whether the door is open or closed.

3.1.2.3.12 Position Confidence Test

a. The AVN must provide each operational position with a position confidence testing feature that can be invoked on demand by the operator by activation of IA keypad sequence or function button.

b. The AVN must provide the position operator a visual indication of incoming communications when the position confidence test is active.

c. The AVN must, through the confidence testing feature, verify proper operation of position audio volume controls and displays.

d. The AVN must, through the confidence testing feature, verify proper operation of position PTT devices.

e. The AVN must, through the confidence testing feature, verify proper operation of the position transmit audio path.

f. The AVN must prohibit the confidence testing feature from changing the position's configuration, and any settings or selections made by the operator.

g. The AVN must provide a method to terminate the position confidence test at any time.

h. The AVN must report the results of the confidence test simultaneously at each operator position initiating the test and to the maintenance log.

i. The AVN must ensure that the position operator can confirm the operability of the position within sixty (60) seconds after the request.

j. The AVN must automatically record the results of the position confidence tests in the maintenance log.

3.1.2.3.13 Unattended Position Operation

a. The AVN must, immediately upon the removal of all instruments from the HS jacks and hand microphone of any position, transfer all incoming audio from A/G and G/G calls (including incoming OVR calls) to the LS.

b. The AVN must, if a HS or hand microphone device is reinserted into any jack before the unattended position timer has expired, restore incoming audio, including calls in progress, to the HS/LS routing previously selected by the operator before the position became unattended, as controlled by an unattended position classmark.

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c. The AVN must, after the unattended position timer has expired, immediately disable all position input devices (input devices are functionally inoperative at an inactive operational position).

d. The AVN must, unless the unattended position timer expires, ensure that no calls in progress or active at the position are dropped.

e. The AVN must, when all HS and microphone devices are removed from the position, permit the operator to continue selection of position functions until the unattended position timer has expired.

f. The AVN must, after any position has remained unattended for more than a configurable number of consecutive seconds, mark the position as unattended.

g. The AVN must provide an unattended position timer that is configurable from 0 to 120 seconds in 1 second increments.

h. The AVN must, after the unattended position timer has expired, release any incoming G/G calls in progress at the position, except incoming OVR calls.

i. The AVN must, after the unattended position timer has expired, prohibit the ability to place or answer calls, select or deselect receivers and transmitters, or to perform any control action other than volume controls (e.g., for chime, HS, LS, and sidetone) and display brightness.

j. The AVN must, after the unattended position timer has expired, route any subsequent incoming A/G calls on selected frequencies to the position LS at the unattended position.

k. The AVN must, after the unattended position timer has expired, route any subsequent incoming OVR calls to the position LS at the unattended position.

l. The AVN must, after the unattended position timer has expired, continue to provide call alert signals (chimes, voice alerts, and visual indications) for all incoming G/G calls.

m. The AVN must, after the unattended position timer has expired, maintain any call forwarding in effect at the unattended position.

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n. The AVN must, after the unattended position timer has expired, maintain any call forwarding in effect at the unattended position.

o. The AVN must, when a position becomes unattended, temporarily prohibit input functionality via the TED, except for page navigation.

p. The AVN must, when a position becomes unattended, temporarily prohibit input functionality via the TED, except for TED brightness control.

q. The AVN must, upon reinsertion of the first HS or hand microphone device into the jacks of an unmanned position, route subsequent incoming A/G and G/G calls, and A/G calls in progress, in accordance with the HS/LS routing selected by the operator before the position became unattended.

r. The AVN must, upon reinsertion of the first HS or hand microphone device into the jacks of an unattended position, restore the ability to place and answer calls and to perform all other control actions at the position.

s. The AVN must ensure that any call forward in effect at an unattended position is maintained when any HS or hand microphone device is reinserted at the unattended position.

3.1.2.3.14 HS/LS Routing of Communications

a. The AVN must ensure that initial default voice routing for G/G incoming audio is to the HS.

b. The AVN must ensure that the initial default voice routing for A/G incoming audio is determine by the per frequency voice routing selector as defined in the position map.

3.1.2.3.14.1 Per-Frequency A/G HS/LS Selectors

a. The AVN must, for each frequency at each position, provide a selector to direct incoming A/G calls either to the HS or to the LS.

b. The AVN must permit the position operator to select the routing of the A/G voice communication with a single touch action.

c. The AVN must permit the position operator with successive touch actions to the per frequency routing selector to toggle the routing between the A/G LS and the HS at the position.

d. The AVN must, for each per-frequency HS/LS selector, provide a continuous display of the selected routing in effect.

e. The AVN must, for each per-frequency HS/LS selector, provide a continuous display of the actual routing in effect.,

3.1.2.3.14.2 G/G HS/LS Selector

a. The AVN must, at positions designated by classmark, provide a selector to direct incoming G/G call audio (other than from incoming OVR calls) either to the HS or to the LS.

b. The AVN must, provide a G/G HS/LS selector, that continuously displays the selected routing in effect at the position.

c. The AVN must, provide a G/G HS/LS selector, that continuously displays the actual routing in effect.,

d. The AVN must permit the position operator to select the routing of all other incoming non-OVR G/G voice communications with a single touch action.

e. The AVN must permit the position operator with successive touch actions of the incoming non-OVR selector to toggle the routing between the G/G LS at the position and the HS at the position.

3.1.2.3.14.3 Incoming OVR HS/LS Selector

a. The AVN must, at positions designated by classmark, provide a selector to direct incoming audio from incoming OVR calls either to the HS or to the LS.

b. The AVN must provide a continuous visual indication of the selected routing in effect at the position on the OVR HS/LS selector.

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c. The AVN must, provide an incoming OVR HS/LS selector, that continuously displays the actual routing in effect.

d. The AVN must permit the position operator to select the routing of the incoming OVR voice communications with a single touch action.

e. The AVN must permit the position operator with successive touch actions of the incoming OVR selector to toggle the routing between the G/G LS at the position and the HS at the position.

3.1.2.3.14.4 Automatic Transfer of A/G Audio to LS During G/G Calls

a. The AVN must allow the automatic transfer of incoming A/G voice from the HS to the position's A/G loudspeaker (or position's LS in a one speaker configuration), as controlled by position classmark.

b. The AVN must, whenever any G/G call, except incoming OVR or when A/G coupling is enabled, is in progress at a position while automatic transfer has been enabled, automatically route all incoming A/G audio from all selected receivers to the LS regardless of the state of the per-frequency HS/LS selector for the selected frequencies.

c. The AVN must, for the purpose of the automatic A/G transfer feature, consider an active position voice monitor not to be a G/G call.

d. The AVN must, for the purpose of the automatic A/G transfer feature, consider "in-progress" with respect to G/G call to be when an outgoing G/G call transitions to the ringing state or when an incoming G/G call becomes active (answered).

e. The AVN must apply the facility setting for all positions (except those at which the operator has overridden it using the automatic routing override feature).

f. The AVN must, if the automatic transfer of routing incoming A/G voice from the HS to the position's A/G loudspeaker has been disabled and the position operator is engaged in G/G communications using the position HS and has also selected incoming A/G to be routed to the positions HS, permit the incoming A/G voice to be heard with the G/G voice in the HS.

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g. The AVN must prohibit the automatic transfer of A/G voice from HS to LS when a position is in split functionality mode, regardless of the position classmark or the position setting.

3.1.2.3.14.5 Deactivation of Automatic Transfer Feature

a. The AVN must, at positions designated by classmark, provide a DA selector to deactivate the position classmark for automatic transfer.

b. The AVN must permit the position operator to select the deactivate automatic transfer feature with a single touch action.

c. The AVN must permit the position operator with successive touch actions of the deactivation of automatic transfer feature selector to toggle between deactivation and enabling of automatic transfer feature at the position.

d. The AVN must provide a continuous display of the deactivate automatic transfer selector's selected state.

e. The AVN must provide a continuous display of the deactivate automatic transfer selector's actual state.

3.1.2.3.14.6 A/G LS Transfer

a. The AVN must, at positions designated by classmark, provide a selector to direct all incoming audio from all A/G frequencies at the position to the LS regardless of the state of the per-frequency HS/LS selector for each frequency and the state of the automatic transfer feature, position classmark, and the state of the OVR automatic transfer feature selector at the position.

b. The AVN must permit the position operator to select the A/G LS transfer feature with a single touch action.

c. The AVN must suspend (place on hold) all active voice monitors at a position, when the A/G LS transfer is selected.

d. The AVN must resume voice monitors when the A/G LS transfer feature is disabled.

e. The AVN must ensure that voice monitors that are suspended, when the A/G LS transfer feature is enabled, are resumed, unless a A/G PTT call is initiated or in progress at the position.

f. The AVN must ensure that voice monitors that are suspended, when the A/G LS transfer feature is enabled, are resumed, unless an outgoing OVR call is initiated or in progress at the position.

g. The AVN must ensure that voice monitors that are suspended, when the A/G LS transfer feature is enabled, are resumed unless a non-OVR call is initiated or in progress at the position.

h. The AVN must ensure that voice monitors that are suspended, when the A/G LS transfer feature is enabled, are resumed unless a position is being overridden and the facility is classmarked for voice monitor suspend on OVR.

i. The AVN must ensure, that all voice monitors that were suspended prior to the activation of the A/G LS transfer feature, remain suspended when the A/G LS transfer feature is disabled.

j. The AVN must permit the position operator, with successive touch actions of the A/G LS transfer feature selector, to toggle between deactivate and enable of A/G LS transfer feature at the position.

k. The AVN must, for the A/G LS transfer selector, provide a continuous display of its actual state as described in section 3.1.2.3.13.

l. The AVN must, for the A/G LS transfer selector, provide a continuous display of the selected state.

3.1.2.3.14.7 Master LS Transfer for All Audio

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a. The AVN must, at positions designated by classmark, provide a selector to direct all incoming audio from all A/G frequencies and all G/G calls (including OVR calls) at the position to the corresponding A/G or G/G LS regardless of the state of the subordinate HS/LS routing selectors.

b. The AVN must, in a one LS configuration, at positions designated by classmark, provide a selector to direct all incoming audio from all A/G frequencies and all G/G calls (including OVR calls) at the position to the LS regardless of the state of the subordinate HS/LS routing selectors.

c. The AVN must permit the position operator to select the master LS transfer all audio feature with a single touch action.

d. The AVN must permit the position operator, with successive touch actions of the master LS transfer all audio feature selector, to toggle between enable and disable of the master LS transfer feature at the position.

e. The AVN must suspend (place on hold) all active voice monitors at a position, when the master LS transfer is enabled.

f. The AVN must resume voice monitors when the master LS transfer feature is disabled.

g. The AVN must ensure that voice monitors that are suspended when the master LS transfer all audio feature is enabled are resumed unless a A/G PTT call is initiated or in progress at the position.

h. The AVN must ensure that voice monitors that are suspended when the master LS transfer feature is enabled are resumed unless an outgoing OVR call is initiated or in progress at the position.

i. The AVN must ensure that voice monitors that are suspended when the master LS transfer feature is enabled are resumed unless a non-OVR call is initiated or in progress at the position.

j. The AVN must ensure that voice monitors that are suspended when the master LS transfer feature is enabled are resumed unless a position is being overridden and the facility is classmarked for voice monitor suspend on OVR.

k. The AVN must ensure that all voice monitors that were suspended prior to the activation of the master LS transfer features remain suspended when the group A/G LS transfer feature is disabled.

l. The AVN must suspend (place on hold) all current voice monitors when the Master LS transfer feature is enabled.

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m. The AVN must, if the Master LS transfer feature is enabled when a position is operating in split functionality mode, automatically suspend the A/G monitor function between the G/G and A/G HS jack modules and automatically suspend all active voice monitors at the position.

n. The AVN must, for the master LS transfer selector, provide a continuous display of the selected state.

3.1.2.3.14.8 Precedence of Routing Features

a. The AVN must follow the following order of precedence for selectors and features that control HS/LS routing of A/G communications: Unattended position transfer to LS (highest precedence); hand microphone only inserted transfer to LS (highest precedence); Master LS transfer (if assigned); Group A/G LS transfer (if assigned); Automatic A/G transfer to LS during G/G call (if enabled); and, Per-frequency HS/LS routing.

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b. The AVN must follow the following order of precedence for selectors and features that control HS/LS routing of inbound non-OVR G/G communications: Unattended position transfer to LS (highest precedence); hand microphone only inserted transfer to LS (highest precedence); Master LS transfer (if assigned); and, G/G LS transfer.

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c. The AVN must follow the following order of precedence selectors and features that control HS/LS routing of inbound OVR G/G communications: Unattended position transfer to LS (highest precedence); hand microphone only inserted transfer to LS (highest precedence); Master LS transfer (if assigned); and, OVR LS transfer (if assigned).

3.1.2.3.15 Acknowledgment of Reconfiguration Selector

a. The AVN must permit a non-latching reconfiguration accept selector to be assigned to each position by authorized access levels.

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b. The AVN must provide a visual indication on the reconfiguration accept selector of pending reconfiguration to positions affected by the reconfiguration.

c. The AVN must, for any attended position(s) affected by a reconfiguration and having a reconfiguration accept selector, require the position(s) to acknowledge acceptance by pressing the selector before reconfiguring the position.

d. The AVN must provide an audible indication to the position when the acknowledgement of reconfiguration selector is selected.

e. The AVN must, for any unattended position(s) affected by a reconfiguration and having a reconfiguration accept selector, reconfigure the position without requiring the position(s) to acknowledge acceptance by pressing the selector.

f. The AVN must, for unattended position(s), inhibit the audible indication to the position when the position has been reconfigured.

g. The AVN must ensure that the reconfigure acceptance selector has no effect if selected while no reconfiguration is pending at that position.

h. The AVN must, for any position(s) affected by a reconfiguration and not having a reconfiguration accept selector, reconfigure the position.

i. The AVN must, for position(s) not having a reconfiguration accept selector, inhibit the audible indication to the position when the position has been reconfigured.

j. The AVN must, once the acknowledgment of reconfiguration has been received from a position, proceed with the reconfiguration without disconnecting calls in progress at that position.

k. The AVN must proceed with the reconfiguration without disconnecting established calls at the position.

3.1.2.3.16 Position System Alarm Selector

a. The AVN must permit authorized personnel to assign a system alarm selector at each position.

b. The AVN must permit the position operator to view the system status pop-up windows pane upon pressing the system status selector.

c. The AVN must, when the position system alarm selector is enabled, preclude disruption of communications at the position.

d. The AVN must permit the position operator to close the system status windows pane upon pressing any selector on the TED.

e. The AVN must activate an alarm chime at the position and turn the alarm selector red upon NVS detection of a critical system alarm.

f. The AVN must activate an alarm chime at the position and turn the alarm selector orange upon NVS detection of a major system alarm.

g. The AVN must permit one position operator to silence the current alarm chime sound, upon activation of the alarm selector for all positions, without affecting the visual alarm or any future alarms at other positions.

h. The AVN must, when a single position operator silences the current alarm chime sound upon activation of the alarm selector, ensure that the audible and visual alarms are not affected at the maintenance position or the system rack.

i. The AVN must ensure that the system alarm chime is only routed to the LS or to the G/G LS if the position is configured with two loudspeakers.

j. The AVN must permit authorized access levels to disable and enable the audible chimes of the system alarm chime.

k. The AVN must ensure that the position system alarm chime is not recorded.

3.1.2.4 Position Displays

a. The AVN must permit authorized personnel to designate whether an operator position is to have one or two Touch Entry Displays (TEDs).

b. The AVN must provide a selector on each TED to allow the operator to select views from the A/G communications.

c. The AVN must provide a selector on each TED to allow the operator to select views from the G/G communications.

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d. The AVN must provide a selector on each TED to allow the operator to select views from both A/G and G/G communications.

e. The AVN must, as configured by authorized personnel, on positions with two TEDs permit independent views on each TED.

f. The AVN must, as configured by authorized personnel, on positions with two TEDs permit mirrored views on each TED, except when the position is operating in split functionally mode.

g. The AVN must provide TEDs capable of displaying at least 32 colors simultaneously.

h. The AVN must provide TEDs capable of imparting coding information by means of color, size, shape, brightness, intensity, and blink of display areas, and change(s) thereto in any combination.

i. The AVN must provide TEDs as ordered by the government.

3.1.2.5 Split Mode Functionality

a. The AVN must permit two operators at a single position to plug into different HS jack modules and separately access A/G and G/G communications.

b. The AVN must prohibit the use of a hand microphone at a position in split functionality mode.

c. The AVN must, while in position split functionality mode, permit a position operator plugged into the A/G dedicated HS jack module to access and receive A/G communications exclusively of G/G communication.

d. The AVN must, while in position split functionality mode, permit a position operator plugged into the dedicated G/G HS jack module to access and receive G/G communications exclusively of A/G communication.

e. The AVN must ensure that audio and signaling paths between the HS jack modules are independent while in position split functionality mode.

f. The AVN must, when a position is in split position mode, adhere to PTT preemption and sidetone rules associated with parallel jack preemption.

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g. The AVN must, while in split position mode, provide A/G position relief briefing recording.

h. The AVN must, while in split position mode, provide G/G position relief briefing recording.

3.1.2.5.1 Position Split Functionality Mode Activation/Deactivation

a. The AVN must prohibit position split functionality mode at positions that do not have both A/G and G/G communications access assigned.

b. The AVN must permit activation of position split functionality mode feature at a position where at least one HS device is plugged into each of the HS jack modules.

c. The AVN must permit position split functionality mode to be enabled by a single touch action to a valid key on either position TED.

d. The AVN must permit position split functionality mode to be enable by entering the appropriate IA code.

e. The AVN must, while position split functionality mode is enabled, provide a continuous visual indication at the position.

f. The AVN must permit an operator using either TED to disable position split functionality mode by a single touch action.

g. The AVN must disable position split functionality mode upon the removal of all HS device from a single HS jack module.

h. The AVN must permit disabling of position split functionality mode by entering the appropriate IA code.

i. The AVN must disable position split functionality mode when reconfiguration removes a position's A/G or G/G communications access.

j. The AVN must maintain the state of position split functionality mode at positions that are reconfigured, but retain access to both A/G and G/G communications.

k. The AVN must, when a position is operating in split mode, ensure that adjustments made to the tone volumes on either TED sets the tone volume for both sides of the position (A/G and G/G).

l. The AVN must, if split mode is disabled when an A/G and G/G call are both active at a position, drop the A/G call and maintain the G/G call.

m. The AVN must, when a position is operating in split mode with an active A/G call and the position is reconfigured, ensure that only the A/G portion of the reconfiguration is delayed until the active A/G call is released.

n. The AVN must complete the execution stage of the reconfiguration before disabling of position split functionality mode (if required).

o. The AVN must provide a notification to classmarked workstations, when position split functionality mode is enabled.

p. The AVN must provide a notification to classmarked workstations, when position split functionality mode is disabled

3.1.2.5.2 Position Split Functionality Mode A/G Monitoring

a. The AVN must permit monitoring of all A/G transmit and receive audio, except audio presented to the position's A/G LS, from the G/G HS jack module.

b. The AVN must provide access to A/G monitoring only when position split functionality mode is enabled at the position.

c. The AVN must permit the position operator to enable the function by a single touch action.

d. The AVN must permit the position operator to disable the function by a single touch action.

e. The AVN must suspend A/G monitoring when the position operator initiates a G/G call or answers a non-override call.

f. The AVN must, as permitted by position classmark, automatically suspend A/G monitoring when the monitoring position is overridden.

g. The AVN must, as permitted by position classmark, automatically mute the A/G monitoring audio (suspend) when A/G monitoring is initiated while the position is being overridden.

h. The AVN must automatically resume A/G monitoring upon termination of the communication that caused the suspension.

i. The AVN must provide a continuous visual indication of the state A/G monitoring at the position.

3.1.2.5.3 Position Split Functionality Mode Position Relief Briefing

a. The AVN must provide an A/G position relief briefing feature for split position mode.

b. The AVN must permit a non-latching selector for split position mode A/G relief briefing to be assigned at each position by classmark during reconfiguration.

c. The AVN must permit a latching selector for split position mode A/G relief briefing to be assigned at each position by classmark during reconfiguration.

d. The AVN must permit activation of split position mode A/G relief briefing by a single touch action of the A/G relief briefing selector.

e. The AVN must, upon activation of the split position mode A/G relief briefing selector, establish a two-way audio connection between both A/G HS jacks equipped at the position such that operators plugged into these jacks may converse with each other without activation of PTT.

f. The AVN must in no way restrict access to, or operation of, A/G communication functions during split position mode A/G relief briefing.

g. The AVN must provide a continuous visual indication of the active state of the A/G position relief briefing at the A/G TED of the position for the duration of the active state.

h. The AVN must provide a continuous visual indication of the suspended state of the A/G position relief briefing at the A/G TED of the position for the duration of the suspended state.

i. The AVN must, when split position mode A/G relief briefing is active, discontinue the audio connections between the A/G jacks (suspend the A/G relief brief at the position) whenever an A/G transmission is in progress at the position.

j. The AVN must, when split position mode A/G relief briefing is suspended, automatically reestablish the audio connections between the A/G jacks at the position whenever a A/G transmission is terminated at the position.

k. The AVN must, upon deactivation of the split position mode A/G relief briefing feature, discontinue the audio connections between the A/G jacks and extinguish the visual indication of relief briefing state.

l. The AVN must, when split mode is enabled while a position is active in a position relief briefing, disable the position relief briefing function and display a message indicating that relief briefing has been disabled.

m. The AVN must, during split position mode A/G relief briefing, permit deactivation of the feature by the removal of one or both HS from the A/G HS jack module.

n. The AVN must provide a G/G position relief briefing feature for split position mode.

o. The AVN must permit a non-latching selector for split position mode G/G relief briefing to be assigned at each position by classmark during reconfiguration.

p. The AVN must permit a latching selector for split position mode G/G relief briefing to be assigned at each position by classmark during reconfiguration.

q. The AVN must permit activation of split position mode G/G relief briefing by a single touch action of the G/G relief briefing selector.

r. The AVN must, upon activation of the split position mode G/G relief briefing selector, establish a two-way audio connection between both G/G HS jacks equipped at the position such that operators plugged into these jacks may converse with each other without activation of PTT.

s. The AVN must in no way restrict access to, or operation of, G/G communication functions during split position mode G/G relief briefing.

t. The AVN must provide a continuous visual indication of the active state of the G/G position relief briefing at the G/G TED of the position for the duration of the active state.

u. The AVN must provide a continuous visual indication of the suspended state of the G/G position relief briefing at the G/G TED of the position for the duration of the suspended state.

v. The AVN must, when split position mode G/G relief briefing is active, discontinue the audio connections between the G/G jacks (suspend the G/G relief brief at the position) whenever a G/G call is in progress at the position.

w. The AVN must, when split position mode G/G relief briefing is suspended, automatically reestablish the audio connections between the G/G jacks at the position whenever a G/G call is terminated at the position

x. The AVN must, upon deactivation of the split position mode G/G relief briefing feature, discontinue the audio connections between the G/G jacks and extinguish the visual indication of relief briefing state.

y. The AVN must, during split position mode G/G relief briefing, permit deactivation of the feature by the removal of one or both HS from the G/G HS jack module.

3.1.2.6 CONR Functions

a. The AVN must, upon receipt of the appropriate enable signal on the CONR G/G Trunk interface, enable the CONR DA button.

b. The AVN must, upon receipt of the appropriate enable signal on the CONR G/G Trunk interface, setup the audio path between the position and the CONR trunk interface.

c. The AVN must, upon receipt of the appropriate disable signal on the CONR G/G Trunk interface, disconnect the audio path between the position and the CONR trunk interface.

d. The AVN must, when the CONR feature is active at a position, route all received A/G audio, regardless of the voice routing selected at the position, to the CONR G/G trunk interface.

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e. The AVN must, upon receipt of the appropriate signaling on the CONR G/G Trunk interface, provide a system generated PTT signal to all selected and enabled A/G frequency(ies) at the CONR classmarked position.

f. The AVN must, when the CONR feature is active at a position and a PTT signal is accreted, route the receive audio from the CONR G/G trunk interface to the transmit path(s) of all selected and enabled A/G transmitters at the position.

g. The AVN must, when the CONR feature is enabled, automatically enable the transmitters and receivers of all frequencies at the position with the exception of multiple site frequencies.

h. The AVN must, for multiple site frequencies, make no changes to the current transmitter or receiver settings.

i. The AVN must ensure that enabling the split mode feature in no way impacts the simultaneous operation of the CONR feature.

j. The AVN must ensure that disabling the split mode feature in no way impacts the simultaneous operation of the CONR feature.

k. The AVN must, upon receipt of the appropriate disable signal on the CONR G/G Trunk interface, disable the CONR DA button.

3.1.2.6.1 CONR Controls

a. The AVN must inhibit enabling of the CONR feature by the position operator.

b. The AVN must inhibit disabling of the CONR feature by the position operator.

c. The AVN must provide an error message indicating invalid touch action to the position operator whenever the CONR DA is touched.

3.1.2.6.2 CONR Visual Displays

a. The AVN must, when the CONR feature is enabled for a position, provide a continuous flashing red CONR G/G DA button.

b. The AVN must continue to flash the CONR G/G DA red until the CONR feature is disabled.

c. The AVN must display the CONR G/G DA button color as grey when the CONR feature is disabled for a position.

3.1.2.7 Unmanned Aircraft System (UAS) Functions

a. The AVN must permit a three party conference to be established between a position operator, a G/G trunk circuit (the pilot) and the enabled A/G frequency(ies).

b. The AVN must provide an UAS Conference function button on the position display.

c. The AVN must continuously display the UAS Conference function button on the position display.

d. The AVN must permit the UAS Conference feature to be enabled with a single touch action to the function button.

e. The AVN must provide a visual indication that the UAS Conference feature is enabled at the position.

f. The AVN must, while the UAS Conference feature is active at the position, cross-connect the voice path of the active G/G trunk circuit(s) to the transmit path of all enabled transmitters at the position.

g. The AVN must, when the UAS conference feature is active, treat the entire conference as a single A/G call.

h. The AVN must, when the UAS conference feature is enabled, display an "ADD MEMBER" function button on the G/G display at the position.

i. The AVN must, while the UAS conference feature is active at the position, permit the position operator to add members to the conference after the G/G call has been answered by a single touch to the Add Member function button.

j. The AVN must, when the UAS conference feature is disabled, remove the Add Member function button from the G/G display.

k. The AVN must, when the UAS conference feature is active at a position without an active PTT and the position operator answers a G/G call, inhibit the audio of the G/G call to the UAS conference.

l. The AVN must permit release of the UAS Conference connection by a single touch action to the UAS Conference function button.

m. The AVN must permit the position operator to release each G/G trunk circuit connected in the conference individually without impacting the continued communications of all other parties in the conference.

n. The AVN must automatically terminate the UAS conference when the last G/G trunk circuit party is released.

o. The AVN must, when the UAS feature is active at the position, route all received A/G audio, regardless of the voice routing selected at the position, to the UAS G/G trunk interface(s).

p. The AVN must, when the UAS feature is active at the position and audio is received from a G/G trunk circuit active in the conference, generate a PTT signal and transmit the received G/G audio over all enabled A/G transmitters at the position.

q. The AVN must, when the UAS feature is active at the position and a PTT signal is accreted by the position operator, route the operator's audio to the UAS G/G trunk interface(s) and to all selected and enabled A/G transmitters at the position.

r. The AVN must, when the UAS feature is active at the position, route the received A/G audio to the UAS G/G trunk interface(s) active in the conference.

s. The AVN must, when the UAS feature is active at the position, ensure that all parties in the conference receive the transmit audio of the other.

t. The AVN must ensure that enabling the split mode feature in no way impacts the simultaneous operation of the UAS feature.

u. The AVN must ensure that disabling the split mode feature in no way impacts the simultaneous operation of the UAS feature.

v. The AVN must, once a UAS conference is established, prohibit the position operation from placing the conference on hold.

w. The AVN must ensure that there is no degradation in signaling time to/from the A/G circuit as a result of implementing this feature.

x. The AVN must ensure that there is no degradation in of voice quality on the A/G circuit as a result of implementing this feature.

y. The AVN must, when the UAS feature is active at the position and the position is overridden, ensure that the G/G OVR audio is not transmitted over any A/G frequency at the position.

z. The AVN s must, when the UAS feature is active at the position and the position receives a voice call, ensure that the voice call audio is not transmitted over any A/G frequency at the position.

aa. The AVN must, when the with UAS feature is active and while PTT is active at any position with the A/G frequency involved in the UAS conference, route the outgoing audio for that frequency to the active UAS G/G conference trunk circuit(s) at the position.

3.1.3 Security

Many of the requirements in this section are derived at a high level from NIST Special Publication 800-53 Revision 3, which can be used as a reference for additional guidance.

3.1.3.1 General Requirements

a. The NVS must remain in a secure state during and after failure of individual network access ports.

b. The NVS must remain in a secure state during and after failure of voice circuits or radio interfaces.

c. The NVS must remain in a secure state during and after failure of external circuits.

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d. The NVS must remain in a secure state during and after failure of any LRU.

e. The NVS must remain in a secure state during and after any attempts of unauthorized external interference.

f. The NVS must remain in a secure state during and after any attempts of unauthorized external tampering.

g. The NVS must remain in a secure state during and after audit record overflow.

h. The NVS must ensure that security-relevant auditable event detection has no interference with ATC communications.

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i. The NVS security activities must run continuously during normal operations.

j. The NVS security activities must run at the request of authorized personnel based on access privileges.

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3.1.3.2 Access Control

a. The NVS must grant access to authorized personnel based on valid access authorization through identification authentication.

b. The NVS must grant access to authorized personnel based on privileges assigned to a given user account at the time of creation.

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c. The NVS must grant access to authorized personnel based on privileges assigned to a given user account at the time of modification.

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3.1.3.2.1 Account Management

a. The NVS must, at a minimum, employ the following automated mechanisms to support the management of system accounts.

(1) The NVS must employ automated mechanisms to manage the creation of user accounts.

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(2) The NVS must employ automated mechanisms to manage the activation of user accounts.

(3) The NVS must employ automated mechanisms to manage the modification of user accounts.

(4) The NVS must employ automated mechanisms to manage the deactivation of user accounts.

(5) The NVS must employ automated mechanisms to manage the deletion of user accounts.

(6) The NVS must employ automated mechanisms to manage review of user accounts.

(7) The NVS must employ automated mechanisms to manage the monitoring of user accounts.

(8) The NVS must employ automated mechanisms to manage the expiration of unused accounts.

b. The NVS must automatically notify authorized personnel of information system attribute events, as described in 3.1.3.2.1 a (1-8), when role-based privileges are applied to authorized personnel user accounts.

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c. The NVS must, when assigned by classmark, provide an audible alarm upon detection of a security-relevant auditable events.

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d. The NVS must, when assigned by classmark, provide a visual alarm upon detection of a security-relevant auditable events.

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e. The NVS must employ automated mechanisms to audit the deactivation of temporary user accounts, in accordance with the classmarked attributes at the time of creation or modification.

f. The NVS must employ automated mechanisms to audit the deletion of temporary user accounts, in accordance with the classmarked attributes at the time of creation or modification.

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g. The NVS must automatically deactivate inactive user accounts attributed to operating system access after inactivity for a configurable period of one to 180 days in one day increments, except those defined in 3.1.3.4 (j) and (k).

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h. The NVS must automatically deactivate inactive user accounts attributed to software application access after inactivity for a configurable period of one to 180 days in one day increments, except those defined in 3.1.3.4 (j) and (k).

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3.1.3.2.2 Access Enforcement

a. The NVS must enforce identity-based accounts to access operating system parameters.

b. The NVS must enforce identity-based access to software application parameters.

c. The NVS must enforce role-based privileged accounts to allow authorized personnel to access operating system parameters.

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d. The NVS must enforce role-based privileged accounts for authorized personnel to access application parameters.

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e. The NVS must protect authenticators in transmission using either encryption or through isolation using a dedicated connection.

f. The NVS must protect authenticator content from unauthorized disclosure and modification, when in transmission.

g. The NVS must protect authenticator content from unauthorized disclosure and modification in storage.

h. The NVS must use encryption for protection of authenticator content while in storage using FAA-approved hardware or software tools that are FIPS 140-2 compliant, in accordance with FAA Order 1370.103, Encryption Policy.

i. The NVS must be FIPS 140-2 level 1 compliant for authentication using cryptographic modules.

j. The NVS must prohibit any mechanism to bypass access based privileges.

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k. The NVS must permit only authorized personnel to access management parameters, as described in 3.1.3.2.1 a (1-8), in accordance with role-based privileges..

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3.1.3.2.3 Information Flow Enforcement

a. The NVS must enforce approved authorizations for controlling the flow of information, within the system and between interconnected systems.

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3.1.3.2.4 Unsuccessful Login Attempts

a. The NVS must detect unsuccessful login attempts.

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b. The NVS must enforce a configurable limit of up to five consecutive invalid access attempts by a user during a configurable period of one to 20 minutes in one minute increments.

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c. The NVS must automatically notify authorized personnel, when assigned by classmark, that the limit of unsuccessful login attempts has been met.

d. The NVS must permit automatically locking of a user account for a configurable period of least 20 minutes, when the maximum number of unsuccessful attempts is exceeded, regardless of whether the login attempt occurs via a local or network connection.

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e. The NVS must permit authorized personnel to release a locked user account, when the maximum number of unsuccessful access attempts is exceeded, regardless of whether the login occurs via a local or network connection.

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3.1.3.2.5 NVS Use Notification

a. The NVS must, prior to granting system access for any user , display a warning banner as part of every system login, in accordance with FAA Order 1370.102, System Use Notification & Disclaimer Statement Policy, as amended, even when systems are accessible from other systems.

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b. The NVS must display the notification message or banner on the screen until users take explicit actions to acknowledge the notification.

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3.1.3.2.6 Session Lock

a. The NVS must permit authorized personnel to set session lock to user accounts.

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b. The NVS must, when session lock is enabled, prevent further access to the system by initiating a session lock for local access sessions, after a configurable amount of inactive time.

c. The NVS must, when session lock is enabled, retain the session lock until the user re-authenticates.

3.1.3.2.7 Logoff

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a. The NVS must close all activity and present a logon screen upon receipt of confirmation from the user that logoff is required.

b. The NVS must return to normal operations upon receipt of a no response to a confirmation question to continue the logoff process.

c. The NVS must automatically logoff a user after a configurable number of minutes, if no user input via any available input device (e.g., keyboard, mouse, touchpad, etc).

d. The NVS must send an alarm to authorized personnel, when a user is automatically logged off.

e. The NVS must permit authorized personnel to set the inactivity timeout period within a configurable period of one to 1,440 minutes in 1 minute increments.

f. The NVS must permit authorized personnel to disable the automatic logoff feature.

g. The NVS must permit authorized personnel to assign automatic logoff per user/group accounts.

h. The NVS must, when a user session is terminated by a logoff, require a subsequent user to be re-authenticated before initiating the next session.

i. The NVS must terminate an interactive session during power failures with associated workstation.

j. The NVS must terminate an interactive session during complete network link disconnections with associated workstation.

3.1.3.2.8 Denial of Access

a. The NVS must deny access, when the user has not logged in with valid identification and, if required, authentication.

b. The NVS must deny access, when the user does not have permission to access a requested resource.

c. The NVS must deny access, when the access request is through a port that does not have permission to access a requested resource.

d. The NVS must identify the network address, identification or access port of unauthorized user trying to access the NVS.

3.1.3.3 Audit and Accountability

3.1.3.3.1 Auditable Events

a. The NVS must automatically generate an audit record, or the report of an auditable event at the instance it occurs, to the security log.

b. The NVS must generate audit records for account creation.

c. The NVS must generate audit records for account activation.

d. The NVS must generate audit records for modifications of attributes assigned by classmark.

e. The NVS must generate audit records for identity-based permissions changes.

f. The NVS must generate audit records for role-based permissions changes.

g. The NVS must generate audit records for configuration changes.

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h. The NVS must generate audit records for administrative activities.

i. The NVS must generate audit records for access to privileged functions (e.g., setting auditable event and intrusion detection devices).

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j. The NVS must generate audit records for account deactivation.

k. The NVS must generate audit records for account deletion.

l. The NVS must generate audit records for review of user accounts.

m. The NVS must generate audit records for monitoring of user accounts.

n. The NVS must generate audit records for the creation of appendices to audit records.

o. The NVS must generate an audit record for successful login and logout.

p. The NVS must generate an audit record for unsuccessful login and logout.

q. The NVS must generate an audit record for automatic logoff.

r. The NVS must generate an audit record for errors or unexpected states.

s. The NVS must generate an audit record for unauthorized access requests.

t. The NVS must generate audit records for Startup of System/Services/processes.

u. The NVS must generate audit records for Shutdown of System/Services/processes.

v. The NVS must generate audit records for results from malicious code protection.

3.1.3.3.2 Content of Audit Records

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a. The NVS must generate audit records that contains at least the following:

(1) The NVS must generate audit records that contain the type of event.

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(2) The NVS must generate audit records that contain the date of event.

(3) The NVS must generate audit records that contain the time of event.

(4) The NVS must generate audit records that contain the system source or subsystem asset where the event occurred.

(5) The NVS must generate audit records that contain the User/subject identification.

(6) The NVS must generate audit records that contain the Outcome of the event (success/failure).

(7) The NVS must generate audit records that contain the Session ID, if applicable.

b. The NVS must ensure that the audit records do not contain sensitive information, such as passwords.

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3.1.3.3.3 Audit Storage Capacity

a. The NVS must document any security-relevant reported auditable events, which become audit records in security logs.

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b. The NVS must allocate sufficient storage capacity to store security-relevant audit records in online storage for a configurable period of at least 90 days.

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c. The NVS must be permitted to configure percentage based thresholds of storage capacity to reduce the likelihood of audit record storage capacity from being exceeded.

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d. The NVS must automatically notify authorized personnel, in the event percentage based thresholds of audit record storage capacity exceeds an assigned limit (e.g. 90% capacity).

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e. The NVS must overwrite oldest audit records (e.g., first in, first out), when audit record storage capacity is reached.

f. The NVS must automatically notify authorized personnel, in the event of an audit processing failure, due to audit storing capacity being reached or exceeded.

g. The NVS must automatically notify authorized personnel, in the event of an audit processing failure due to software/hardware errors (e.g. failed hard drives).

3.1.3.3.4 Audit Reduction and Report Generation

a. The NVS must provide an audit reduction capability supporting after-the-fact security incident investigations, without altering original audit records in the form of security log files.

b. The NVS must provide report generation capability supporting after-the-fact security incident investigations without altering original audit records in the form of security log files.

c. The NVS must provide centralized security-relevant audit records, in the form of security log files that permit search or filter upon selectable criteria.

d. The NVS must provide centralized security-relevant audit records, in the form of security log files that generate an output report in a printable format (e.g. hard copy).

e. The NVS must provide centralized security-relevant audit records, in the form of security log files that generate an output report, which can be saved to external device (e.g. soft copy).

f. The NVS must permit authorized personnel, with privileged functions to create appendices to audit records.

g. The NVS must provide the soft copy security log files on removable media format (e.g., USB drive).

h. The NVS must provide the soft copy security log files in a format compatible with Microsoft Windows Office suite of products.

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3.1.3.3.5 Time Stamps

a. The NVS must provide time stamps (including date, time, and UTC offset) for any reported auditable events in audit records.

b. The NVS must internally generate time stamps that are synchronized with an external NTP time source to allow time stamping of security-relevant auditable events in the security log.

c. The NVS must time stamp security-relevant auditable events in the security log with a granularity of 1 ms.

3.1.3.3.6 Protection of Audit Information

a. The NVS must protect audit information from unauthorized access.

b. The NVS must protect audit tools from unauthorized access.

c. The NVS must protect audit information from unauthorized modification.

d. The NVS must protect audit tools from unauthorized modification.

e. The NVS must protect audit information from unauthorized deletion.

f. The NVS must protect audit tools from unauthorized deletion.

3.1.3.3.7 Audit Generation

a. The NVS must permit authorized personnel, with privileged functions assigned by classmark, to select which security-relevant auditable events are to be audited by specific components or fundamental elements (e.g. AVN).

3.1.3.4 Identification and Authentication

a. The NVS must permit implementation of user accounts with unique identifiers for users .

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b. The NVS must implement unique identifiers for processes acting on behalf of users.

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c. The NVS must maintain a record of security relevant roles for each user requiring access authorization.

d. The NVS must maintain authentication data for each user requiring access authorization.

e. The NVS must implement unique authenticators for users in accordance with FAA Order 1370.92A, Password and PIN Management.

f. The NVS must implement unique authenticators for processes acting on behalf of users in accordance with FAA Order 1370.92A, Password and PIN Management.

g. The NVS must permit the implementation of group accounts that do not require identifiers and authenticators for local logical access.

h. The NVS unique identifier must be the User Principal Name in the form of the user's assigned email address, except as stated in (h) and (i) below.

i. The NVS must prohibit the use of a User Identifier by more than one user, except for those stated in (h) and (i) below.

j. The NVS must have User Identifiers of "2nd level" and "3rd level" and associated second factor authentication installed at the factory.

k. The NVS must restrict User Identifiers "2nd level" and "3rd level" to factory settings precluded from access by site administrators.

l. The NVS must use multifactor authentication for remote access into internal FAA networking environments.

m. The NVS must use multifactor authentication for remote access to privileged functions.

n. The NVS must permit a user to change their own password.

o. The NVS must permit each user password to change in accordance with a configurable lifespan of two to 180 days in one day increments, except for one-time-use passwords, which have no minimum lifespan.

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p. The NVS must require at least one character be changed at every password change cycle.

q. The NVS must prevent password reuse for at least 10 password change cycles.

r. The NVS must obscure feedback of authentication information or the masking of passwords to prohibit passwords from being displayed, during the authentication process to protect the information from possible unauthorized exploitation.

3.1.3.4.1 User Identifier

s. The NVS must permit the storage of at least 1000 user identifiers, with associated role-based attributes.

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<#>The NVS must require an alphanumeric user profile identifier. ¶
<#>The NVS must allow authorized personnel to configure user identifiers for each user; e.g., number and variety of acceptable characters.¶

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3.1.3.5 System Information Integrity

3.1.3.5.1 Malicious Code Protection

a. The NVS must centrally manage malicious code protection mechanisms.

b. The NVS must employ malicious code protection mechanisms to detect malicious code.

c. The NVS must employ malicious code protection mechanisms to eradicate malicious code in response to malicious code detection.

d. The NVS must be configurable to quarantine malicious code in response to malicious code detection.

e. The NVS must automatically update malicious code protection mechanisms, including required security patches, malicious code signature updates, and spam protection updates, whenever new releases are available.

f. The NVS must be configurable to perform scans at least weekly.

g. The NVS must provide the option to perform real-time scans of files from external sources as the files are downloaded.

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h. The NVS must provide the option to perform real-time scans of files from external sources as the files are opened.

i. The NVS must provide the option to perform real-time scans of files from external sources as the files are executed.

3.1.3.5.2 Information System Monitoring

a. The NVS must prevent non-privileged users from circumventing malicious code protection capabilities.

b. The NVS must deploy mechanisms to detect unauthorized changes to operating system software.

c. The NVS must deploy mechanisms to detect unauthorized changes to application based software.

d. The NVS must deploy mechanisms to detect unauthorized changes to attributes and privileged functions.

3.1.3.5.3 Software and Information Integrity

a. The NVS must reassess the integrity of operating system software upon startup, inclusive of power up, by performing integrity scans of the information system.

b. The NVS must reassess the integrity of application software upon startup, inclusive of power up, by performing integrity scans of the information system.

c. The NVS must reassess the integrity of audit records upon startup, inclusive of power up, by performing integrity scans of the information system.

d. The NVS must check information for accuracy as close to the point of origin as possible prior to processing.

e. The NVS must check information for completeness as close to the point of origin as possible prior to processing.

f. The NVS must check information for validity as close to the point of origin as possible prior to processing.

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g. The NVS must check information for authenticity as close to the point of origin as possible prior to processing.

h. The NVS must reassess the integrity of operating system software upon detection of discrepancies during integrity verification.

i. The NVS must reassess the integrity of application software upon detection of discrepancies during integrity verification.

j. The NVS must reassess the integrity of audit records upon detection of discrepancies during integrity verification.

3.1.3.5.4 Information Input Validation

a. The NVS must check the syntax of information inputs to verify that it matches specified format and content definitions prior to processing.

b. The NVS must prescreen information inputs passed to interpreters to prevent the content from being unintentionally interpreted as commands prior to processing.

c. The NVS must restrict access to error messages and error logs only to authorized personnel, via either physical or logical access controls.

3.1.4 Maintenance and Testing Functions

3.1.4.1 Fault Detection

a. The NVS must automatically and continually perform system diagnostics during power up to detect system faults and validate correct operation.

b. The NVS must automatically and continually perform system diagnostics during system operation to detect system faults and validate correct operation.

c. The NVS must automatically detect faults in software.

d. The NVS must automatically detect faults in hardware.

e. The NVS must automatically detect faults in firmware.

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f. The NVS must ensure that fault detection does not interfere with system operations.

g. The NVS must report all defined faults to all classmarked workstations and to maintenance log simultaneously.

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h. The NVS must report all failures to all classmarked workstations and to the maintenance log simultaneously.

i. The NVS must report all recovery attempts to all classmarked workstations and to the maintenance log simultaneously

j. The NVS must ensure data paths are monitored by error detection and correction programs to ensure the integrity of transmitted messages.

k. The NVS must ensure data paths are monitored by error detection and correction programs to ensure the integrity of received messages.

l. The NVS must perform hardware fault and failure detection and isolation to the line replaceable unit (LRU) level.

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m. The NVS must provide fault isolation through the designated use of automatic on-line fault isolation, Built-in Test Equipment (BITE), and Built-in Test (BIT).

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n. The NVS must provide fault isolation through the designated use of automatic off-line fault isolation, BITE, and BIT.

o. The NVS must provide fault isolation through the designated use of manual off-line fault isolation, BITE, and BIT

p. The NVS must detect and identify on-line faults down to two or less LRUs in 95% of all failures.

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q. The NVS must detect and identify on-line faults down to one module in 90% of all failures.

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r. The NVS must detect and identify all faults with a confidence of at least 99.9%

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s. The NVS must automatically remove visual alerts from all equipment receiving the indication when the fault conditions are corrected.

3.1.4.2 Diagnostics

a. The NVS must permit classmarked workstations to initiate automatic diagnostic testing.

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b. The NVS must permit classmarked workstations to initiate manual diagnostic testing.

c. The NVS must permit classmarked workstations to establish any connections that can be provided to operator positions for performing offline diagnostic tests.

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<#>The NVS must permit authorized workstations to establish connections between operational positions and network interfaces for the purpose of performing diagnostic tests.¶

d. The NVS must provide diagnostics for self-testing, failure detection, and isolation in the on-line mode.

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e. The NVS must provide loop-back testing in the on-line mode.

f. The NVS must permit classmarked workstations to conduct end-to end audio quality diagnostic tests for legacy circuits.

g. The NVS must permit classmarked workstations to conduct end-to end IP quality diagnostic tests for Ethernet based connections.

h. The NVS must provide diagnostics for self-testing, failure detection, and isolation in the off-line mode.

i. The NVS must provide for operator position initiated diagnostics to confirm operability of any position functions.

j. The NVS must report diagnostic test results to classmarked workstations.

k. The NVS must permit printing of diagnostic test results by classmarked workstations.

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3.1.4.3 Maintenance Workstation Function

a. The NVS workstations must support maintenance function.

b. The NVS must permit any workstation to be used to access maintenance functions.

c. The NVS must permit access to maintenance functions based on the user login.

d. The NVS must provide the maintenance function displays, alarms, and special test equipment required for fault detection, fault localizing and system restoration.

e. The NVS must permit workstations, alarms, displays and special test equipment to be mounted in equipment racks or integrated with other NVS equipment.

f. The NVS must permit the maintenance workstation function to request, control, display, store, and transfer on-site system tests and test results.

g. The NVS maintenance workstation function must permit the selection of reports and displays based on the defined NVS LRUs.

h. The NVS must ensure that the maintenance workstation provides data summary analysis that includes: univariate descriptive statistics, correlations, graphs, histograms, and scatter plots in accordance with section 3.5.3.4.1

3.1.4.4 System Audio Alignment and Test Point Access

a. The NVS must, for all NVS equipment, provide test points for interconnecting test equipment for determining the performance quality of the equipment.

b. The NVS must provide test points in accordance with FAA-G-2100h.

c. The NVS must provide access for connecting test equipment to digital A/G resources for local testing.

d. The NVS must provide access for connecting test equipment to digital G/G resources for local testing.

e. The NVS must provide access for connecting test equipment to analog A/G resources for local testing.

f. The NVS must provide access for connecting test equipment to analog G/G resources for local testing.

g. The NVS must provide monitor access for connecting test equipment to digital A/G resources for local testing.

h. The NVS must provide monitor access for connecting test equipment to digital G/G resources for local testing

i. The NVS must provide monitor access for connecting test equipment to analog A/G resources for local testing.

j. The NVS must provide monitor access for connecting test equipment to analog G/G resources for local testing.

k. The NVS must provide access for connecting test equipment to the digital inputs and outputs of position equipment.

l. The NVS must provide access for connecting test equipment to the analog inputs and outputs of position equipment.

m. The NVS must provide monitor access for connecting test equipment to the digital inputs and outputs of position equipment.

n. The NVS must provide monitor access for connecting test equipment to the analog inputs and outputs of position equipment.

o. The NVS must provide means to adjust the NVS for use with analog and digital external networks and interfaces.

p. The NVS must ensure that all test points and alignment controls are readily accessible without disassembly of equipment.

q. The NVS must, when safety allows, provide test point access to modules from outside the basic equipment through the use of swing-out units, pull-out drawers with drawer slides, cable extenders, and cable retractors.

r. The NVS must permit adjustments of equipment to be accomplished through the use of built-in meters, or with portable test instruments.

s. The NVS must minimize the variety and number of special tools and test equipment required to maintain the equipment

3.1.4.5 Maintenance Logging Function

a. The NVS must provide a maintenance logging function to store maintenance history of the NVS.

b. The NVS must provide a maintenance log that contains faults detected by the fault detection features.

c. The NVS must provide a maintenance log that contains results of diagnostics.

d. The NVS must provide a maintenance log that contains restoration activities.

e. The NVS must provide a time stamp for each entry in the maintenance log synchronized with an external NTP time source.

f. The NVS must time stamp entries in the maintenance log with a granularity of 1 ms.

g. The NVS must provide a maintenance log that is capable of storing at least 90 days of maintenance history.

h. The NVS must, when the maintenance log file storage limit is reached, overwrite the oldest stored records.

i. The NVS must prohibit the modification of system maintenance log entries.

j. The NVS must permit authorized users to annotate maintenance log entries.

k. The NVS must prohibit modification of annotated maintenance log entries. The NVS must ensure that any annotated entry to the maintenance log includes the date, time, and user identification appended to each entry.

l. The NVS must permit annotation of the maintenance log by authorized and classmarked workstations.

m. The NVS must provide a hard copy printout of the maintenance log upon request by authorized personnel.

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n. The NVS must provide a soft copy file of the maintenance log upon request by authorized personnel.

o. The NVS must provide the soft copy log file on removable media format.

p. The NVS must provide the soft copy log file in a format compatible with Microsoft Windows Office suite of products.

q. The NVS must provide the soft copy log file in such a format as to permit sorting and searching of maintenance log entries.

r. The NVS must, at a minimum, permit sorting and searching of the maintenance log for the following parameters:

s. The NVS must permit sorting and searching of the maintenance log by date/time.

t. The NVS must permit sorting and searching of the maintenance log by date/time range.

u. The NVS must permit sorting and searching of the maintenance log by event type.

v. The NVS must permit sorting and searching of the maintenance log by device type.

w. The NVS must permit sorting and searching of the maintenance log by device name.

3.1.4.5.1 Event and Fault Lists

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a. The NVS must permit authorized personnel to generate a prioritized current fault list report from any workstation.

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b. The NVS must present the current fault list report by severity.

c. The NVS must list the faults chronologically, within each event severity.

d. The NVS must permit authorized personnel to print the current fault list from any workstation.

e. The AVN must provide a continuous visual indication of the total count of active faults to any workstation classmarked to receive the data.

f. The AVN must provide, for display, an event list of the 40 most recent system events.

g. The AVN must permit authorized personnel to access the event list from any workstation.

h. The AVN must provide the display of the event list in chronological order.

i. The AVN must permit authorized personnel to select which event classes (e.g. Critical, Major, or Minor) are displayed at any workstation.

j. The NVS must permit authorized personnel to print the event list from any workstation.

3.1.4.6 Alarms

a. The NVS must provide audible and visible alarms to indicate the detection of system faults.

b. The NVS must provide volume adjustments for audible alarms.

c. The NVS must permit audible alarms to be enabled and disabled by authorized access levels.

d. The NVS must, upon automatic recovery of a resource, discontinue the audible alarm.

e. The NVS must, upon automatic recovery of a resource, maintain the visual indication until the fault event is acknowledged.

f. The NVS must prohibit an audible alarm from being provided as notification of automatic recovery of a resource.

g. The NVS must allow audible alarms to be definable based on system fault severity.

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h. The NVS must provide audible and visible alarms to signal system overheat conditions that would lead to equipment damage or fire.

i. The NVS must provide the audible and visual alarms to the classmarked workstations.

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j. The NVS must, as ordered by the government, provide the audible and visual alarms to remote alarm panels.

k. The NVS must, as configured by authorized personnel, provide the audible and visual alarms to positions having the system alarm selector assigned.

l. The NVS must permit authorized personnel to assign alarm status as critical, major or minor to faults.

(1) The NVS must, for alarms classified as critical, provide an unique audible alarm and a visual indication.

(2) The NVS must, for alarms classified as major, provide an unique audible alarm and a visual indication.

(3) The NVS must, for alarms classified as minor, provide a unique visual indication.

m. The NVS must require acknowledgement of the events classified as critical.

n. The NVS must require no acknowledgement of the events classified as major.

o. The NVS must require no acknowledgement of the events classified as minor.

p. The NVS must permit each event message in TABLE 3-2 to be assigned/routed to one or more groups.

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q. The NVS must, upon acknowledgement by any workstation, silence only the alarm(s) at that workstation.

r. The NVS must, as ordered by the government, provide audible and visual alarms to remote alarm panels.

s. The NVS must, as configured by authorized personnel, provide audible and visual alarms to positions having the system alarm selector assigned.

t. The NVS must, as ordered by the government, support a minimum of fifty (50) user definable discrete alarm inputs.

u. The NVS must accept normally opened alarm inputs.

v. The NVS must supply a maximum voltage of 48 VDC to open contacts of alarm input.

w. The NVS must accept normally closed alarm inputs.

x. The NVS must supply a maximum current of 60 mA through closed contacts of alarm input.

y. The NVS must support the use of Internet Protocol (IP) based alarms.

TABLE 3-2. NVS Event Messages

EVENT MESSAGE	SEVERITY
System Startup	Minor
Reconfiguration	
Reconfiguration Successful	Minor
Reconfiguration Unsuccessful	Critical
Reconfiguration Completed with Errors	Minor
Reconfiguration Cancelled	Minor
Modularity and Growth	Minor
Over-Temp	Critical
Over-Temp Normal	Minor
Emergency Freq Not Monitored	Minor
Split Enabled	Minor
Split Disabled	Minor
Logon/Logoff	
Remote Logon/Logoff (in) Valid	Minor
Normal Logon/Logoff (in) Valid	Minor
Logon Denied	Minor
Logon Failed	Minor
Logoff Forced-New Operator	Minor
Logoff Forced-WS Off-line	Minor
Unauthorized Logon Failed	Critical

EVENT MESSAGE	SEVERITY
Traffic Log Overwrite	Minor
Traffic Log Status	Minor
Equipment Fitness	
NBS Time Reference Lost	Minor
NBS Time Reference Reestablished	Minor
AC Power Loss: Load Control, Control Room	Critical
AC Power Restored: Load Control, Control Room	Critical
AC Power Loss: Control Room	Critical
AC Power Restored: Control Room	Critical
AC Power Loss: Branch, Equipment Room	Minor
AC Power Restored: Branch, Equipment Room	Minor
AC Power Loss: Equipment Room	Critical
AC Power Restored: Equipment Room	Critical
UPS on Battery	Critical
UPS AC Power Restored	Critical
UPS Fault	Minor
UPS Recovered	Minor
UPS on Bypass	Minor
UPS Returned to Inverter	Minor
Alternate Source Fault	Minor
Alternate Source Recovered	Minor
Power Conditioner Fault	Minor
Power Supply Fault	Minor
Power Supply Restored	Minor
Fuse Fault	Minor
Fuse Recovered	Minor
Time Reset	Minor
Traffic	
Media Backup	Minor
Collection ON/OFF	Minor
Functional Status	
Frequency/Trunk Loss	Critical
Frequency/Trunk Recovery	Minor
Media Transfer Failed	Minor
Unauthorized Access Attempt	Critical
General Notice	Critical

3.1.5 Management Functions

3.1.5.1 Supervisory Functions

a. The NVS workstations must support supervisory function.

b. The NVS must permit access to supervisory functions based on the user login.

c. The NVS must permit any workstation to be used to access supervisory functions.

d. The NVS must permit only authorized user(s) to perform reconfigurations.

e. The NVS must permit any authorized user to perform a logical reconfiguration.

f. The NVS must permit any authorized user to perform a logical-to-physical reconfiguration.

g. The NVS must permit any authorized user to perform a combination of a logical and a logical-to-physical reconfiguration.

h. The NVS must permit any authorized user to perform a combination of a logical reconfigurations.

i. The NVS must allow a request that performs a single reconfiguration which combines two sectors, rolls out a third sector (e.g., to add another position) and change the physical console assignment for a non-sector ATC position.

3.1.5.1.1 Supervisory System Status Display

a. The NVS must display all uncorrected maintenance actions and alarms (if any) on authorized users' workstation, identifying the functions (circuits, positions, etc.) affected.

b. The NVS must display the status of any ongoing reconfigurations on the authorized users' workstation related to position equipment that impact operations within the authorized user's scope of responsibility.

c. The NVS must permit authorized users to request and view a summary of the current NVS operational status, as it applies to the user's scope of responsibility.

d. The NVS must ensure that status updates related to position equipment failures or reconfiguration failures that impact operations within the authorized user's scope of responsibility are automatically provided to user. .

e. The NVS must display system overheat conditions to authorized users.

f. The NVS must, if reserve power is provided, display the status of the reserve power system to authorized users.

g. The NVS must ensure that the summary status provides authorized personnel with an at-a-glance summary of all operational alerts and failures that are applicable to their areas.

3.1.5.1.2 Unmonitored Receiver Report

a. The NVS must provide the authorized users' workstations with a visual indication of all A/G frequencies for which no operator has selected the corresponding receiver (unmonitored).

b. The NVS must provide a defeatable audible alarm each time any frequency designated by classmark becomes unmonitored for more than the unmonitored receiver timeout period.

c. The NVS must allow authorized users to adjust the unmonitored receiver timeout period from 0 to 30 seconds in increments of 1 second.

d. The NVS must, if the unmonitored receiver timer is set to 0 (zero) seconds, allow deselection of the receiver at all but the final position that has the receiver selected.

3.1.5.1.3 Supervisory Position

a. The NVS must permit the area supervisory position operator to make temporary modifications to assignments and classmarks in position maps for operational positions for contingency purposes.

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b. The NVS must, for Logical-To-Physical (LTP) reconfigurations, retain temporary modifications of the reconfigured position(s).

c. The NVS must, when the area supervisory position requests a logical reconfiguration that will reconfigure a position(s) whose current map(s) has (have) been temporarily modified, provide the initiator with a display of the position(s) with temporary modifications.

d. The NVS must provide modifications in effect at each such position in sufficient detail to permit the requestor to determine the differences in A/G and G/G resources and classmarks between the current modified position(s) configuration and the unmodified (i.e., DEO-created) version of the position(s) map(s) in effect.

e. The NVS must permit the area supervisory position to selectively retain previously implemented temporary modification for logical positions that are logically reconfigured.

f. The NVS must, if the initiator elects not to retain previously implemented temporary modifications, the logical reconfiguration eliminates these modifications.

3.1.5.2 Traffic Data Collection, Reduction, and Analysis

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a. The NVS must provide online communication traffic data collection and offline reduction and analysis.

b. The NVS must ensure that communications traffic data collection, reduction, and analysis does not interfere with or degrade the performance of any NVS communication process.

c. The NVS must ensure that communications traffic data collection, reduction, and analysis does not interfere with or degrade the throughput of any NVS communications process.

d. The NVS must collect communications traffic data that includes, at a minimum, information on position incoming and outgoing communications.

e. The NVS must collect communications traffic data that includes, at a minimum, position call initiations and terminations.

f. The NVS must collect voice communications traffic data that includes, at a minimum, call processing times.

g. The NVS must collect voice communications traffic data that includes, at a minimum, position relief briefing initiation and termination.

h. The NVS must collect voice communications traffic data that includes, at a minimum, call types such as DA, IA, IC, Interphone, OVR, voice calls, conference calls, trunk calls, A/G calls, and PTT, and weather message broadcasting.

i. The NVS must collect, at a minimum, all selections of system state changes (e.g., M/S for transmitters/ receivers, activation/deactivation of BUEC for a frequency).

j. The NVS must collect, at a minimum, selections of local position changes (e.g., auto-transfer, split functionality, voice page on/off).

k. The NVS must collect, at a minimum, reconfiguration selections (e.g., maps in use, temporary modifications, and reconfiguration processing times).

l. The NVS must collect, at a minimum, activation of special call features such as IA OVR, CA queue call selection.

m. The NVS must collect, at a minimum, the activation of special call functions such as monitoring and call forwarding.

n. The NVS must provide communications traffic information associated with reconfiguration status

o. The NVS must provide communications traffic information associated with updates from the coded time source.

p. The NVS must provide formatted traffic data records, using data coding as approved by the FAA, containing, at minimum, GMT and communication traffic information with a time-stamp accurate to within 0.01 second of the occurrence of the recorded event.

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3.1.5.2.1 Traffic Data Collection

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a. The NVS must collect traffic data continuously as the events occur.

3.1.5.2.2 Traffic Data Reduction

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<#>The NVS must provide traffic data reduction by combining traffic data records to create a new data record.¶
<#>The NVS must prepare traffic data for analysis with functions that include traffic data integrity checks.¶
<#>The NVS must prepare traffic data for analysis with functions that include screening of data.¶
<#>The NVS must prepare traffic data for analysis with functions that include extraction of detail for analysis.¶
<#>The NVS must provide traffic data integrity checks to define minimum and maximum limits and to define standard deviation limits to be calculated to determine valid data.¶
<#>The NVS must provide data exception reports identifying data that is not valid.¶
<#>The NVS must be able to identify and remove data not considered valid or data outliners from the data to be used for a specific analysis.¶
<#>The NVS must be able to identify and to select categories of data for analysis.¶
<#>The NVS must be able to save selected reduced and screened data into a data file for subsequent analysis.¶

a. The NVS must provide traffic data reduction by combining traffic data records to create a new data record.

b. The NVS must prepare traffic data for analysis with functions that include traffic data integrity checks.

c. The NVS must prepare traffic data for analysis with functions that include screening of data.

d. The NVS must prepare traffic data for analysis with functions that include extraction of detail for analysis.

e. The NVS must provide traffic data integrity checks to define minimum and maximum limits and to define standard deviation limits to be calculated to determine valid data.

f. The NVS must provide data exception reports identifying data that is not valid.

g. The NVS must be able to identify and remove data not considered valid or data outliners from the data to be used for a specific analysis.

h. The NVS must be able to identify and to select categories of data for analysis.

i. The NVS must be able to save selected reduced and screened data into a data file for subsequent analysis.

3.1.5.2.3 Traffic Data Analysis Requirements

a. The NVS must be able to conduct statistical evaluation of the traffic data collected and reduced.

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b. The NVS must be able to automatically activate periodic and on-request analyses at specified days, dates, and times.

c. The NVS must be able to perform statistical evaluation of traffic data by selecting the data to be analyzed and by selecting the type of analysis to be performed.

d. The NVS must allow data selection to specify subgroups within the data file to access.

e. The NVS must provide traffic data summary analysis that includes: univariate descriptive statistics, correlations, graphs, histograms, and scatter plots in accordance with section 3.5.3.4.1.

f. The NVS must provide data analyses such as analysis of variance, regression analysis, and trend analysis.

g. The NVS must provide statistical programs that can handle varying amounts of data.

h. The NVS must provide statistical programs that can analyze the volume of data generated over a one-week period.

3.1.5.2.3.1 Traffic Data Analysis Statistics

a. The NVS must provide summaries and analyses for call duration distribution by call type.

b. The NVS must provide summaries and analyses for blocked calls.

c. The NVS must provide summaries and analyses for lost calls.

d. The NVS must provide summaries and analyses for delayed calls.

e. The NVS must provide summaries and analyses for uncompleted calls.

f. The NVS must provide summaries and analyses for busy tone terminations.

g. The NVS must provide summaries and analyses for answered calls.

h. The NVS must provide summaries and analyses for unanswered calls.

i. The NVS must provide summaries and analyses for the use of monitoring.

j. The NVS must provide summaries and analyses for the use of call forwarding.

k. The NVS must provide summaries and analyses for HS/LS selection.

l. The NVS must provide summaries and analyses for user initiated display brightness adjustments.

m. The NVS must provide summaries and analyses for preemption.

n. The NVS must provide summaries and analyses for cross-coupling.

o. The NVS must provide summaries and analyses for voting algorithm results.

p. The NVS must provide summaries and analyses for BUEC selection.

q. The NVS must provide summaries and analyses for number of simultaneous calls in the system.

r. The NVS must provide summaries and analyses for incoming/outgoing calls per hour, per call type.

s. The NVS must provide summaries and analyses for total call minutes per hour per call type at the facility level.

t. The NVS must provide summaries and analyses for total call minutes per hour per call type at the area level.

u. The NVS must provide summaries and analyses for total call minutes per hour per call type at the sector level.

v. The NVS must provide summaries and analyses for total call minutes per hour per call type at the position level.

w. The NVS must provide summaries and analyses for PTT activations for A/G and G/G calls.

x. The NVS must provide summaries and analyses for call originations and terminations.

y. The NVS must provide summaries and analyses for facility DA call usage.

z. The NVS must provide summaries and analyses for facility IA call connections and usage.

aa. The NVS must provide summaries and analyses for area DA call usage.

bb. The NVS must provide summaries and analyses for area IA call connections and usage.

cc. The NVS must provide summaries and analyses for sector DA call usage.

dd. The NVS must provide summaries and analyses for sector IA call connections and usage.

ee. The NVS must provide summaries and analyses for position to DA call usage.

ff. The NVS must provide summaries and analyses for IA call connections and usage.

gg. The NVS must provide summaries and analyses at the facility level for the number of calls in the CA queue in any given hour.

hh. The NVS must provide summaries and analyses at the facility level for the amount of time calls are in the CA queue.

ii. The NVS must provide summaries and analyses at the facility level for use of selective or oldest call answer from the queue.

jj. The NVS must provide summaries and analyses at the area level for the number of calls in the CA queue in any given hour.

kk. The NVS must provide summaries and analyses at the area level for the amount of time calls are in the CA queue.

ll. The NVS must provide summaries and analyses at the area level for use of selective or oldest call answer from the queue.

mm. The NVS must provide summaries and analyses at the sector level for the number of calls in the CA queue in any given hour.

nn. The NVS must provide summaries and analyses at the sector level for the amount of time calls are in the CA queue.

oo. The NVS must provide summaries and analyses at the sector level for use of selective or oldest call answer from the queue.

pp. The NVS must provide summaries and analyses at the position level for the number of calls in the CA queue in any given hour.

qq. The NVS must provide summaries and analyses at the position level for the amount of time calls are in the CA queue.

rr. The NVS must provide summaries and analyses at the position level for use of selective or oldest call answer from the queue.

ss. Summaries and analyses must be available to provide, at a minimum, interfacility communications to trunk loading and overloading.

tt. Summaries and analyses must be available to provide, at a minimum, inter-facility communications to throughput timing (time to establish or disconnect the call).

uu. Summaries and analyses must be available to provide, at a minimum, inter-facility communications to trunks used by time, percent used, number of times used, trunks used simultaneously in a trunk group

vv. Summaries and analyses must be available to provide, at a minimum, reconfiguration and position relief recording to frequency of use.

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ww. Summaries and analyses must be available to provide, at a minimum, reconfiguration and position relief recording to distribution of position relief briefing times.

xx. Summaries and analyses must be available to provide, at a minimum, reconfiguration and position relief recording to distribution of reconfiguration times.

yy. Summaries and analyses must be available to provide, at a minimum, reconfiguration and position relief recording to occurrence of calls in progress during reconfiguration.

zz. Traffic data analyses must be performed with results available within 4 hours for data collected in last 24 hours.

3.1.5.2.4 Data Transfer

a. The NVS must permit the transfer of the communications traffic information collected to mass storage.

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b. The NVS must provide a mass storage device that that is capable of saving, at a minimum, all data collected during one-day.

c. The NVS must validate all collected data prior to the transfer to mass storage.

d. The NVS must provide controls to prevent loss of data before, during, and after data transfer.

3.1.6 Reconfiguration

a. The AVN must ensure that all functions requiring user authorization for access can be uniquely assigned to group(s).

b. The AVN must ensure that all reconfigurations are performed only by authorized personnel at a classmarked workstation.

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c. The AVN must provide software controlled classmarks to restrict access to functions and resources.

d. The AVN must ensure that each position is assigned a NAS unique logical identifier.

e. The AVN must ensure that each frequency is assigned a NAS unique identifier

f. The AVN must provide configuration maps consisting of structured listings of reconfiguration items as described below.

g. The AVN must permit reconfigurations to be executed in accordance with predetermined maps in response to reconfiguration commands.

h. The AVN must ensure that the position displays correspond to the current map.

i. The AVN must provide a single reconfiguration that includes all physical and logical resource mapping definitions.

j. The AVN must ensure that the execution of reconfiguration does not, in any way, interrupt call(s) in progress.

k. The AVN must ensure that the execution of reconfiguration does not, in any way, disturb call(s) in progress.

l. The AVN must ensure that the execution of reconfiguration provides the current alerting status at the position for each assigned resource.

m. The AVN must, at each operational position, ensure that the position's logical identifier is continuously displayed.

n. The AVN must, in cases where two or more positions that have been combined, continuously display only the primary logical position identifier for the operational position.

o. The AVN must, in cases where two or more positions have been combined, permit the display of all logical position identifiers.

p. The AVN must, for each reconfiguration level, provide an indication at the workstation of which position(s) require reconfiguration because the position map is changing.

q. The AVN must permit authorized personnel to force reconfiguration of any position(s).

r. The NVS must provide online centralized storage of all configuration data for each facility.

s. The NVS must provide offline centralized storage of all configuration data for each facility.

3.1.6.1 Configuration Database

3.1.6.1.1 Configuration Database Management

a. The AVN must permit authorized personnel access to the configuration data base for creating configuration and reconfiguration map data.

b. The AVN must permit authorized personnel access to the configuration data base for modifying configuration and reconfiguration map data.

c. The AVN must permit authorized personnel access to the configuration data base for storing configuration and reconfiguration map data.

d. The AVN must permit authorized personnel access to the configuration data base for copying configuration and reconfiguration map data.

e. The AVN must permit authorized personnel access to the configuration data base for deleting configuration and reconfiguration map data.

f. The AVN must ensure that a validated configuration data base is available in real time.

g. The AVN must require the management of the configuration data base to be accomplished in an off-line mode.

h. The AVN must allow the transition of the configuration data base from off-line to online.

i. The AVN must permit the simultaneous development of a minimum of twenty offline databases.

j. The AVN must permit authorized personnel to request the validation of any offline data base at any time.

k. The AVN must permit any offline data base to be marked as unavailable for online use.

3.1.6.2 Data Base Content

a. The AVN must provide a data base that consists of all facility physical and logical configuration data.

b. The AVN must permit the definition of, at a minimum, 25 position maps per position in the configuration database.

c. The AVN must permit the configuration data base to contain at least the 100 sector maps per airspace sector.

d. The AVN must permit the configuration data base to contain at least 250 area maps per area.

e. The AVN must permit the configuration data base to contain at least 50 facility maps.

f. The AVN must provide storage for management of the configuration data base, backups of the configuration data base and maintain the maps and data bases under development in support of resectorization.

g. The AVN must include a log of all changes made to the configuration data base.

h. The AVN must maintain the log of changes for each configuration data base for a minimum of 180 days without any loss of data.

i. The AVN must include recovery utilities or procedures to maintain the configuration data base used to recover a corrupted data base.

j. The AVN must include database utilization utilities to maintain the configuration data base.

k. The AVN must include a database integrity verification application to validate compliance with data base development rules.

l. The AVN must include a database integrity verification application to validate successful transfer of the configuration data base.

m. The AVN must ensure that any errors identified during the validation process is reported to classmarked workstations.

n. The AVN must prevent conflicts between multiple users simultaneously modifying the same configuration data base.

o. The AVN must support automatic database backup of any configuration data base.

p. The AVN must support scheduling of data base backups by authorized personnel.

q. The AVN must support manual data base backups by authorized personnel.

r. The AVN must support database compression for each configuration data base.

3.1.6.2.1 Position Identifiers

a. The AVN must ensure the physical location of all positions are specified in the physical position assignment mapping.

b. The AVN must permit physical position identifiers to be up to a twenty-five character alphanumeric string.

c. The AVN must ensure that the physical position identifiers are site adaptable.

d. The AVN must permit the logical position identifier to consist of up to twenty-two alphanumeric characters.

3.1.6.3 Logical Configuration

3.1.6.3.1 Reconfiguration Items/Function

3.1.6.3.1.1 A/G Communications

3.1.6.3.1.1.1 Frequency Assignment

a. The AVN must permit authorized personnel to assign A/G frequencies to positions through reconfiguration.

b. The AVN must permit authorized personnel to assign any frequency(ies) to any position(s) through reconfiguration.

c. The NVS must permit authorized personnel to assign any network addressable frequency(ies) across facility boundaries to any position(s) through reconfiguration.

d. The NVS must, via network A/G interface, permit authorized personnel to assign access to local radio frequency(ies) across facility boundaries to any position(s) through reconfiguration.

e. The NVS must, via network A/G interface, permit authorized personnel to assign access to frequency(ies) via the RCE Emulation interface across facility boundaries to any position(s) through reconfiguration.

f. The AVN must allow position(s) to have no frequency(ies) assigned.

g. The AVN must allow frequency(ies) that are not assigned to position(s).

h. The AVN must permit authorized personnel to assign multiple site group(s) to position(s) through reconfiguration.

i. The AVN must allow position(s) to have no multiple site group(s) assigned.

j. The AVN must allow multiple site group(s) that are not assigned to position(s).

k. The AVN must permit authorized personnel to assign the initial (startup) state of the per-frequency HS/LS routing selectors at each position through reconfiguration.

l. The AVN must permit authorized personnel to assign the initial (startup) state of the per-frequency TX selectors, except for multiple site groups and frequencies with non-latching TX selectors, at each position through reconfiguration.

m. The AVN must permit authorized personnel to assign the initial (startup) state of the per-frequency RX selectors at each position through reconfiguration.

n. The AVN must permit authorized personnel to assign which frequencies are classmarked with latching frequency transmitter activation through reconfiguration.

o. The AVN must permit authorized personnel to assign which frequencies are classmarked with non-latching frequency transmitter activation through reconfiguration.

p. The AVN must permit authorized personnel to classmark which frequencies will be included in the unmonitored frequency reporting capability through reconfiguration.

3.1.6.3.1.1.2 Emergency Frequency Operation

a. The AVN must permit authorized personnel to designate which A/G frequencies are to be classmarked as emergency frequencies through reconfiguration.

b. The AVN must permit authorized personnel to designate which positions have an emergency frequency transmit-all selector that simultaneously keys all transmitters designated as emergency transmitters that are assigned at the operator position through reconfiguration.

c. The AVN must permit authorized personnel to designate which positions have an emergency frequency transmit-all selector that simultaneously keys all transmitters selected at an operator position in addition to designated UHF and VHF emergency transmitters that are assigned at the position through reconfiguration.

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d. The AVN must permit authorized personnel to designate which positions have an emergency frequency transmit-all selector that simultaneously keys all transmitters selected at an operator position in addition to designated VHF emergency transmitters that are assigned at the position through reconfiguration.

e. The AVN must permit authorized personnel to designate which positions have an emergency frequency transmit-all selector that simultaneously keys all transmitters selected at an operator position in addition to designated UHF emergency transmitters that are assigned at the position through reconfiguration.

f. The AVN must, as classmarked, ensure that at least one VHF emergency frequency transmitter is selected at a position within an area.

g. The AVN must, as classmarked, ensure that at least one UHF emergency frequency transmitter is selected at a position within an area.

h. The AVN must, for each area, permit authorized personnel to classmark which emergency frequencies will be included in the unmonitored frequency reporting capability through reconfiguration.

3.1.6.3.1.1.3 BUEC/ECS

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a. The AVN must permit authorized personnel to designate which A/G frequencies, including emergency frequencies, can be classmarked as BUEC/ECS frequencies through reconfiguration.

b. The AVN must permit authorized personnel to designate which A/G frequencies, including emergency frequencies, are to be associated with each BUEC/ECS frequency through reconfiguration.

c. The AVN must permit authorized personnel, by position classmark, to enable access to BUEC/ECS function.

d. The AVN must permit authorized personnel, by position classmark, to disable access to BUEC/ECS function.

3.1.6.3.1.1.4 Automatic Transfer of A/G Audio

a. The AVN must permit authorized personnel, by position classmark, to enable automatic transfer of A/G audio to LS during G/G calls through reconfiguration.

b. The AVN must permit authorized personnel, by position classmark, to disable automatic transfer of A/G audio to LS during G/G calls through reconfiguration.

c. The AVN must permit authorized personnel to assign DA selectors to any or all positions to deactivate the facility automatic transfer setting for only that position through reconfiguration.

3.1.6.3.1.1.5 Radio Preemption

a. The AVN must, for each A/G frequency, permit authorized personnel to designate which positions have preemption privileges over the frequency through reconfiguration.

3.1.6.3.1.1.6 A/G LS Transfer

a. The AVN must permit authorized personnel to assign DA selector to any or all positions for operation of A/G LS transfer through reconfiguration.

b. The AVN must permit authorized personnel to assign the initial state of any A/G LS transfer selectors assigned through reconfiguration.

3.1.6.3.1.1.7 Frequency Monitor

a. The AVN must permit authorized personnel to assign a frequency monitor classmark to A/G frequencies through reconfiguration.

3.1.6.3.1.1.8 Frequency Cross Coupling

a. The AVN must, permit authorized personnel to assign a position level classmark to enable A/G frequency cross coupling at a position through reconfiguration.

b. The AVN must, permit authorized personnel to assign a position level classmark to disable A/G frequency cross coupling at a position through reconfiguration.

3.1.6.3.1.1.9 Site Group Maintenance

a. The AVN must permit authorized personnel to classmark positions to enable the site group maintenance feature through reconfiguration.

b. The AVN must permit authorized personnel to classmark positions to disable the site group maintenance feature through reconfiguration.

3.1.6.3.1.1.10 Site Group Control

a. The AVN must permit authorized personnel to assign a site group control classmark to a position(s) to allow the selection of the current site transmitter for the site group through reconfiguration.

3.1.6.3.1.1.11 Diversity Voting Algorithm Enable/Disable

a. The AVN must permit authorized personnel to classmark a position to allow enabling of the diversity voting algorithm feature for site groups through reconfiguration.

b. The AVN must permit authorized personnel to classmark a position to allow disabling the diversity voting algorithm feature for site groups through reconfiguration.

3.1.6.3.1.1.12 Paired Frequency Tracking

a. The AVN must permit authorized personnel to classmark a position to allow enabling of the paired frequency tracking feature through reconfiguration.

b. The AVN must permit authorized personnel to classmark a position to allow disabling of the paired frequency tracking feature through reconfiguration.

3.1.6.3.1.2 G/G Communications

3.1.6.3.1.2.1 Non-IC Assignment (G/G Trunks)

a. The AVN must permit authorized personnel to assign DA selectors to all position(s) for the operation of G/G trunk through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors to any position(s) for the operation of G/G trunk groups installed on the NVS through reconfiguration.

3.1.6.3.1.2.2 IC Assignments

a. The AVN must permit authorized personnel to assign DA selectors to any position(s) for the placement of IC calls within the facility through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors to any position(s) for the placement of IC calls outside the facility through reconfiguration.

3.1.6.3.1.2.3 G/G Trunk Privacy

a. The AVN must permit authorized personnel to classmark each G/G trunk to enable privacy operation through reconfiguration.

b. The AVN must permit authorized personnel to classmark each G/G trunk to disable privacy operation through reconfiguration.

3.1.6.3.1.2.4 Restriction of Access to G/G Communications

a. The AVN must permit authorized personnel to assign a position classmark to designate which G/G trunks are accessible to the position via DA through reconfiguration.

b. The AVN must permit authorized personnel to assign a position classmark to designate which G/G trunks are accessible to the position via IA through reconfiguration.

c. The AVN must permit authorized personnel to assign a position classmark for any CO/PABX circuit to restrict dialing of definable sequences by the position through reconfiguration.

d. The AVN must permit authorized personnel to designate, for each position, which positions can access CO/PABX trunks through reconfiguration.

e. The AVN must permit authorized personnel to designate, for each position, which positions can receive calls from CO/PABX trunks through reconfiguration.

f. The NVS must permit authorized personnel to, when connected via a network interface, permit any position operator to access any G/G resource physically connected to any AVN to establish the requested G/G communication through reconfiguration.

g. The NVS must permit authorized personnel to, when connected via a selective dial legacy interface, permit any NVS position operator to access identical selective dial legacy resources physically connected to any AVN to establish the requested G/G communication through reconfiguration.

h. The NVS must permit authorized personnel to, when connected via a selective dial legacy interface, permit any legacy position operator to access identical selective dial legacy resources physically connected to any AVN to establish the requested G/G communication through reconfiguration.

3.1.6.3.1.2.5 OVR Call Operation for G/G Trunks

a. The AVN must permit authorized personnel to configure G/G trunks to permit incoming calls to be connected on an OVR basis through reconfiguration.

b. The AVN must permit authorized personnel to configure G/G trunks groups to permit incoming calls to be connected on an OVR basis through reconfiguration.

c. The AVN must permit authorized personnel to set up the override circuit as one-way outbound communications through reconfiguration.

d. The AVN must permit authorized personnel to set up the override circuit as one way inbound communications through reconfiguration.

e. The AVN must permit authorized personnel to set up the override circuit as two-way communications through reconfiguration.

3.1.6.3.1.2.6 G/G OVR Notification Control

a. The AVN must permit authorized personnel to assign a position classmark to enable the momentary audible indication of incoming G/G override call through reconfiguration.

b. The AVN must permit authorized personnel to assign a position classmark to disable the momentary audible indication of incoming G/G override call through reconfiguration.

c. The AVN must permit authorized personnel to assign a position classmark to enable the momentary audible indication of outgoing G/G override call through reconfiguration.

d. The AVN must permit authorized personnel to assign a position classmark disable the momentary audible indication of outgoing G/G override call through reconfiguration.

3.1.6.3.1.2.7 G/G IA OVR

a. The AVN must permit authorized personnel to assign a position classmark to enable access to the IA OVR feature through reconfiguration.

b. The AVN must permit authorized personnel to assign a position classmark to disable access to the IA OVR feature through reconfiguration.

3.1.6.3.1.2.8 G/G IA Voice Monitor

a. The AVN must permit authorized personnel to assign a position classmark to enable access to the IA voice monitor feature through reconfiguration.

b. The AVN must permit authorized personnel to assign a position classmark to disable access to the IA voice monitor feature through reconfiguration.

3.1.6.3.1.2.9 Incoming G/G OVR Call Termination

a. The AVN must permit authorized personnel to assign a position classmark to enable incoming OVR call termination by the called position through reconfiguration.

b. The AVN must permit authorized personnel to assign a position classmark to disable incoming OVR call termination by the called position through reconfiguration.

3.1.6.3.1.2.10 Recorder Warning Tone

a. The AVN must permit authorized personnel to enable, for each CO/PABX interface, the recorder warning tone through reconfiguration.

b. The AVN must permit authorized personnel to disable, for each CO/PABX interface, the recorder warning tone through reconfiguration.

3.1.6.3.1.2.11 System Call Progress Tones - Reserved

3.1.6.3.1.3 G/G Call Functions

3.1.6.3.1.3.1 Call Hold

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the call hold function through reconfiguration.

3.1.6.3.1.3.2 Progressive Conference Calling

a. The AVN must permit authorized personnel to assign DA selectors to any position for placement of progressive conference calls through reconfiguration.

3.1.6.3.1.3.3 Preset Conference Calling

a. The AVN must permit authorized personnel to define lists of callers for preset conferences through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors for preset conference call placement to any position through reconfiguration.

3.1.6.3.1.3.4 Call Forwarding

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the call forwarding function through reconfiguration.

b. The AVN must permit authorized personnel to assign a classmark to allow authorized personnel to discontinue call forwarding at another position.

c. The AVN must permit authorized personnel to enable call forwarding between positions through reconfiguration.

d. The AVN must permit authorized personnel to disable call forwarding between positions through reconfiguration.

3.1.6.3.1.3.5 Hook Flash

a. The AVN must permit authorized personnel to assign DA selector to any position for operation of the hook flash function through reconfiguration.

3.1.6.3.1.3.6 Manual Ringdown

a. The AVN must permit authorized personnel to assign DA selector to any position for operation of the ringdown function through reconfiguration.

3.1.6.3.1.3.7 Override of Automatic Transfer

a. The AVN must permit authorized personnel to assign DA selectors to any position for override of automatic transfer of A/G audio to LS during G/G calls through reconfiguration.

3.1.6.3.1.3.8 G/G HS/LS Transfer

a. The AVN must permit authorized personnel to assign DA selectors to any position for HS/LS transfer of G/G calls through reconfiguration.

3.1.6.3.1.3.9 OVR HS/LS Transfer

a. The AVN must permit authorized personnel to assign DA selectors to any position for HS/LS transfer of incoming OVR calls through reconfiguration.

b. The AVN must permit authorized personnel to assign the initial state of the OVR HS/LS transfer selectors assigned at any position through reconfiguration.

3.1.6.3.1.3.10 Call Transfer

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the call transfer function through reconfiguration.

3.1.6.3.1.3.11 Speed Dial

a. The AVN must permit authorized personnel to configure speed dial definitions through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors to any position for speed dial call placement through reconfiguration.

3.1.6.3.1.3.12 Call Mute

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the call mute function through reconfiguration.

3.1.6.3.1.3.13 Position Monitoring

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the position monitoring function through reconfiguration.

b. The AVN must permit authorized personnel to enable, for each position, the incoming override G/G call monitor suspend feature through reconfiguration.

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c. The AVN must permit authorized personnel to disable, for each position, the incoming override G/G call monitor suspend feature through reconfiguration.

d. The AVN must permit authorized personnel to define, for each position, the combinations of audio provided to all other positions monitoring the position through reconfiguration.

e. The AVN must permit authorized personnel to designate, for each position, which positions can be monitored through reconfiguration.

f. The AVN must permit authorized personnel to designate, for each position, which positions can enable the monitoring function through reconfiguration.

3.1.6.3.1.3.14 Audible Alert Enable/Disable

a. The AVN must permit authorized personnel to assign DA selectors to any position for operation of the Audible Alert Enable/Disable function through reconfiguration.

3.1.6.3.1.3.15 A/G-G/G Coupling

a. The AVN must permit authorized personnel to assign DA selectors to any position for A/G-G/G coupling through reconfiguration.

3.1.6.3.1.3.16 Electronic Contact List

a. The AVN must permit authorized personnel to assign a DA selector to any position for operation of the contact list function through reconfiguration.

b. The AVN must provide controls to authorized personnel to edit the contact list directory database through reconfiguration.

c. The AVN must provide controls to authorized personnel to configure individual operator position contact lists to restrict access to entries within the list through reconfiguration.

3.1.6.3.1.4 Relief Briefing

a. The AVN must permit authorized personnel to assign DA selectors to any position for relief briefing operation through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors to any split position for split position relief briefing operation through reconfiguration.

3.1.6.3.1.5 Master LS Transfer for All Audio

a. The AVN must permit authorized personnel to assign DA selectors to any position for the operation of master LS transfer for all audio through reconfiguration.

3.1.6.3.1.6 Door Release

a. The AVN must permit authorized personnel to assign DA selectors to any position for the operation of any facility entry door release circuits through reconfiguration.

3.1.6.3.1.7 DA Selector Latching

a. The AVN must permit authorized personnel to assign latching capabilities for DA selectors having this choice through reconfiguration.

b. The AVN must permit authorized personnel to assign non-latching capabilities for DA selectors having this choice through reconfiguration.

3.1.6.3.1.8 DA Selector Audible Alert

a. The AVN must permit authorized personnel to assign audible alert ON state for DA selectors having this choice through reconfiguration.

b. The AVN must permit authorized personnel to assign audible alert OFF state for DA selectors having this choice through reconfiguration.

3.1.6.3.1.9 Position Numbering

a. The AVN must permit authorized personnel to assign position numbers for the purpose of placing IC calls within the facility through reconfiguration.

b. The AVN must permit authorized personnel to assign position numbers for the purpose of receiving IC calls within the facility through reconfiguration.

c. The AVN must permit authorized personnel to assign position numbers for the purpose of placing IC calls to positions outside the facility through reconfiguration.

d. The AVN must permit authorized personnel to assign position numbers for the purpose of receiving IC calls from positions outside the facility through reconfiguration.

3.1.6.3.1.10 Selective Interphone Numbering

a. The AVN must permit authorized personnel to assign position numbers for the purpose of receiving selective Interphone calls through reconfiguration.

b. The AVN must permit authorized personnel to assign position numbers for the purpose of placing selective Interphone calls through reconfiguration.

c. The AVN must permit authorized personnel to assign addresses to groups of positions for the purpose of receiving selective Interphone calls through reconfiguration.

3.1.6.3.1.11 G/G PTT Options

a. The AVN must permit authorized personnel to assign, for each position, the G/G PTT Option.

3.1.6.3.1.12 System Alarm Selector

a. The AVN must permit authorized personnel to assign DA selectors to any position for reception of system alarm status through reconfiguration.

3.1.6.3.1.13 Split Position

a. The AVN must permit authorized personnel to designate, for each position, which positions have the ability to support split position mode through reconfiguration.

b. The AVN must permit authorized personnel to assign DA selectors to any position for activation of split position mode at the position through reconfiguration.

c. The AVN must permit authorized personnel to assign DA selectors to any position for activation of split position A/G monitor at the position through reconfiguration.

d. The AVN must permit authorized personnel to assign DA selectors to any position for activation of A/G relief briefing through reconfiguration.

e. The AVN must permit authorized personnel to assign DA selectors to any position for activation of G/G relief briefing through reconfiguration.

3.1.6.3.1.14 CONR

a. The AVN must permit authorized personnel to assign the CONR classmark to any position in the facility through reconfiguration.

b. The AVN must permit authorized personnel to assign new A/G frequencies to a position with the CONR feature active through reconfiguration.

c. The AVN must, when the CONR feature is active at a position and new A/G frequencies are added to the position through reconfiguration, default the state of the transmitters and receivers to ON.

d. The AVN must ensure that the CONR G/G DA button can only be assigned to positions that are classmarked for A/G communications.

e. The AVN must, when the CONR classmark is assigned to a position and a logical to physical reconfiguration is performed on that position, ensure that the CONR classmark is maintained at the new physical position

f. The AVN must, when the CONR feature is enabled at a position, ensure that the CONR trunk connectivity is maintained without interruption through any reconfigurations.

3.1.6.3.1.15 UAS

a. The AVN must provide a position classmark to enable the UAS conference feature at any position.

b. The AVN must permit the UAS conference classmark to be controlled through reconfiguration.

c. The AVN must permit authorized personnel to assign the UAS conference classmark to any position in the facility through reconfiguration.

3.1.6.3.1.16 Reconfiguration Enable Button

a. The AVN must permit authorized personnel to assign DA selectors to any position for the operation of acknowledgement of reconfiguration through reconfiguration.

3.1.6.3.2 Configuration Map Creation and Editing

a. The AVN workstation must permit authorized personnel to create reconfiguration maps.

b. The AVN workstation must permit authorized personnel to modify reconfiguration maps.

c. The AVN workstation must permit authorized personnel to store reconfiguration maps.

d. The AVN workstation must permit authorized personnel to delete reconfiguration maps.

e. The AVN workstation must permit authorized personnel to copy reconfiguration maps.

f. The AVN workstation must provide on-screen reports showing the content of reconfiguration maps.

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g. The AVN workstation must permit authorized personnel to print reports showing the content of reconfiguration maps.

h. The AVN workstation must permit authorized personnel to define position-level reconfiguration maps involving any position(s).

i. The AVN workstation must permit authorized personnel to define sector-level reconfiguration maps involving groups of any position(s).

j. The AVN workstation must permit authorized personnel to define area-level reconfiguration maps involving groups any sector(s) and any position(s).

k. The AVN workstation must permit authorized personnel to define facility-level reconfiguration maps involving groups of any area(s), any sector(s) and any position(s).

l. The AVN workstation must permit authorized personnel to display the current logical configuration of the system.

m. The AVN workstation must permit authorized personnel to display the current software configuration of the system.

n. The AVN workstation must permit authorized personnel to "cut and paste" procedures or similar on-line aids to reduce repetitive data entry in assembling reconfiguration maps.

o. The AVN must provide a soft copy file of a configuration map upon request by authorized personnel through the workstation.

p. The AVN must provide the configuration map file on removable media format.

q. The AVN must provide the configuration map file in a format exportable to Microsoft Windows Office suite of products.

r. The AVN must permit the development of maps that identify operator positions, independent of their physical address, and specifying call connectivity between operator positions.

s. The AVN must permit the grouping of position maps into hierarchical structures of sector, area, and facility maps.

t. The AVN must permit the development of switch maps that relate the logical and physical maps.

3.1.6.3.3 Physical Configuration

3.1.6.3.3.1 Data base(s)

a. The NVS data base(s) must contain the configuration of all positions.

b. The NVS data base(s) must contain the configuration of all A/G circuits.

c. The NVS data base(s) must contain the configuration of all G/G circuits.

d. The NVS data base(s) must contain the configuration of all network circuits.

e. The NVS data base(s) must contain the configuration of all RRNs .

f. The NVS data base(s) must contain the configuration of local NVSMS.

g. The NVS data base(s) must contain the configuration of aggregate NVSMS.

h. The NVS must permit physical position assignment mapping to be created off-line and downloaded to the operational system as part of the configuration map database.

3.1.6.3.3.2 Physical Characteristics

a. The AVN must permit authorized personnel to define a position configuration with one TED.

b. The AVN must permit authorized personnel to define a position configuration with two TEDs.

c. The AVN must permit authorized personnel to define a position configuration with one HS jack module.

d. The AVN must permit authorized personnel to define a position configuration with two HS jack modules.

e. The AVN must permit authorized personnel to define a position configuration with one speaker.

f. The AVN must permit authorized personnel to define a position configuration with two speakers.

g. The AVN must, in physical configuration maps, include for each position, sector, area, and facility configuration map, a switch map (or equivalent that defines the desired connectivity.

3.1.6.3.3.3 Data base View/Modification

a. The AVN workstation must permit authorized personnel to display the current physical configuration of the system.

b. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each position installed in the system as online.

c. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each position installed in the system as maintenance busy.

d. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each A/G circuit installed in the system as online.

e. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each A/G circuit installed in the system as maintenance busy.

f. The AVN workstation must permit authorized personnel to modify a the NVS data base(s) to classify each G/G circuit installed in the system as online.

g. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each G/G circuit installed in the system as maintenance busy.

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h. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each network interface installed in the system as online.

i. The AVN workstation must permit authorized personnel to modify the NVS data base(s) to classify each network interface installed in the system as maintenance busy.

j. The AVN must permit the development of physical maps defining the hardware configuration of a facility.

k. The AVN must require entry of a valid password before permitting the physical configuration file to be altered.

l. The AVN must permit authorized personnel to print the contents of the data base.

m. The AVN must permit authorized personnel to request a soft copy file of the data base.

n. The AVN must permit authorized personnel to copy the data base to removable media format.

o. The AVN must permit changes to the mappings via on-line modifications in accordance with 3.1.6.5.2.

3.1.6.3.3.4 Configuration of A/G Interfaces

a. The AVN must provide a configuration data file that contains a list of all AVN ports used to access radio interfaces.

b. The AVN must store data information on the radio interfaces configuration to include frequencies.

c. The AVN must store data information on the radio interfaces configuration to include sites for each frequency with transmission and reception collocated.

d. The AVN must store data information on the radio interfaces configuration to include sites for transmission and sites for reception for each frequency.

e. The AVN must store data information on the radio interfaces configuration to include radio interface module to access from the AVN for each frequency site.

f. The AVN must permit authorized personnel to define paired radios.

g. The AVN must permit authorized personnel to define which radios are a part of the pair.

h. The AVN must permit authorized personnel to define paired radios configured to use a single trunk interface.

i. The AVN must permit authorized personnel to define paired radios using a dual trunk interface. .

j. The AVN must, when paired radios are configured for dual trunk operation mode, permit authorized personnel to temporarily remove either radio from the pair for maintenance, without affecting the operation of the other radio..

k. The AVN must include a radio classmark (Selective Mode Transmitter Tracking) in configuration data for selective (paired) frequencies.

l. The AVN must, when the Selective Mode Transmitter Tracking a radio classmark is assigned, ensure that both transmitters of the pair are enabled when either of the transmitters is enabled.

m. The AVN must ensure that the disabling of transmitters is not affected by selective mode transmitter tracking.

n. The AVN must, when the Selective Mode Transmitter Tracking a radio classmark is assigned, enable both receivers when one receiver of the pair is enabled.

o. The AVN must disable both receivers when one receiver of the pair is disabled

p. The NVS must ensure that the M/S selection status remains in agreement with the last operational configuration.

q. The NVS must ensure that the receiver remote muting status remains in agreement with the last operational configuration.

3.1.6.3.3.5 Emergency Communications

d. The AVN must provide a configuration data base that contains frequencies and corresponding assigned BUEC/ECS access ports.

e. The AVN must provide a configuration data base that contains the operational positions capable of selecting BUEC/ECS for each frequency.

3.1.6.4 Default Configuration

a. The AVN must continually retain the most recent facility configuration indefinitely in non-volatile memory on each resource.

b. The AVN must permit authorized personnel to assign a default facility configuration map that includes the physical configuration settings and facility map.

c. The AVN must ensure that a default facility configuration map is assigned.

d. The AVN must ensure that only one default facility configuration map is assigned.

e. The AVN must ensure that default facility configuration map is read only.

f. The AVN must permit authorized personnel to reassign the default facility configuration map.

g. The AVN must, as controlled by classmark, recover from a system restart with the default facility configuration map.

h. The AVN must, as controlled by classmark, recover from a system restart with the last facility configuration map loaded.

i. The AVN must, as controlled by classmark, recover from a position restart with the default position map.

j. The AVN must, as controlled by classmark, recover from a position restart with the last position map loaded.

k. The AVN must, upon restart of any resource other than a position, recover with the default physical configuration.

3.1.6.5 Logical to Physical Mapping

3.1.6.5.1 Logical to Physical Map Creation and Display

a. The AVN must permit the user to select the assignments ordered by logical position identifier.

b. The AVN must permit the user to select the assignments ordered by physical position identifier.

c. The AVN must, under a given facility map hierarchy; permit a Logical-to-Physical (LTP) reconfiguration to be performed to reinstate the original physical position assignment mapping for the facility.

d. The AVN must, under a given facility map hierarchy; permit a Logical-to-Physical (LTP) reconfiguration to be performed to reinstate the original physical position assignment mapping for an any individual position (s).

e. The AVN must permit the initiator's to request this LTP reconfiguration with a concurrent logical reconfiguration.

f. The AVN must permit the initiator's to request this LTP reconfiguration without a concurrent logical reconfiguration.

g. The AVN must permit changes to the mappings via on-line modifications in accordance with 3.1.6.5.2.

3.1.6.5.2 Logical to Physical Mapping Modifications

a. The AVN must permit on-line modifications of the logical to physical console assignment.

b. The AVN must permit modifications to the current physical console assignment in effect.

c. The AVN must, when an LTP reconfiguration is requested to reinstate the original physical position assignment mapping, provide the initiator the option to make modifications prior to executing the reconfiguration.

d. The AVN must control access to LTP reconfiguration by classmark.

e. The AVN must permit the authorized personnel to modify the physical console assignment for any logical console identifier.

f. The AVN must permit the Area Supervisors to modify only those physical console assignments for logical console identifiers within their area(s) of responsibility.

g. The AVN must maintain modifications through subsequent logical reconfigurations.

h. The AVN must ensure modifications remain in effect until altered by a subsequent LTP reconfiguration.

i. The AVN must prohibit modifications to the original mapping stored in the configuration database.

j. The AVN must ensure that only the installation of a new configuration database may alter the stored maps.

k. The AVN must, in the case of a failure, recover to the physical console assignment mapping in effect prior to the failure.

l. The AVN must ensure that only modifying the physical position assignment for a single logical position is permitted to transfer an existing logical position to any unused (i.e., unmapped or spare) physical position.

m. The AVN must permit the user to view the desired changes prior to executing the changes.

n. The AVN must, upon command by the initiator, download the appropriate position maps to the affected position, adjust the switch map in accordance with the requested modifications, and execute the reconfiguration.

o. The AVN must have no limit to the number of sequential modifications which may be made to the physical position assignment mapping.

p. The AVN must process overlapping or simultaneous modification requests in accordance with 3.1.6.3.1 and 3.1.6.5.5.5.7.

3.1.6.5.3 Unmapped Positions

a. The AVN must ensure that every logical position is assigned to a physical position.

b. The AVN must permit physical position lacking a logical position assignment.

3.1.6.5.4 Reconfiguration Levels

a. The AVN must perform configuration at the position-level.

b. The AVN must perform configuration at the sector-level.

c. The AVN must perform configuration at the area-level.

d. The AVN must perform configuration at the facility-level.

3.1.6.5.4.1 Position-Level Reconfiguration

a. The AVN must, for position-level reconfiguration, permit the reconfiguration of a single position.

b. The AVN must, for position-level reconfiguration, permit the selection of a different position map for an existing, previously assigned logical position.

c. The AVN must, for position-level reconfiguration, permit the modification of classmarks for any operational position.

3.1.6.5.4.2 Sector-Level Reconfiguration

a. The AVN must, for sector-level reconfiguration, permit the reconfiguration of groups of positions defined as sectors.

b. The AVN must permit a sector to be comprised of up to five (5) logical positions.

c. The AVN must, for sector-level reconfiguration, permit the initiator to indicate those positions within a sector that are to be reconfigured.

d. The AVN must, for a sector-level reconfiguration, ensure that only those positions within the sector whose position map is changing are reconfigured unless the reconfiguration is forced.

e. The AVN must, for sector-level reconfiguration, retain the current configuration in effect for positions that are unaffected by the sector reconfiguration.

f. The AVN must, for a sector-level reconfiguration, permit classmarked workstations to request a sector-level reconfiguration in conjunction with an area level reconfiguration.

3.1.6.5.4.3 Area-Level Reconfiguration

a. The AVN must, for area-level reconfiguration, permit reconfiguration of groups of sectors defined as areas.

b. The AVN must, for area-level reconfiguration, permit reconfiguration of individual positions within areas.

c. The AVN must, for area-level reconfiguration, permit the initiator to indicate those sectors within an area that are to be reconfigured.

d. The AVN must, for area-level reconfiguration, permit the initiator to indicate those positions within an area that are to be reconfigured.

e. The AVN must, for area-level reconfiguration, ensure that only those positions within the area whose position map is changing are reconfigured unless the reconfiguration is forced.

f. The AVN must, for area-level reconfiguration, retain the current configuration in effect for positions that are unaffected by the area reconfiguration.

3.1.6.5.4.4 Facility-Level Reconfiguration

a. The AVN must, for facility-level reconfiguration, permit reconfiguration of groups of areas defined as a facility.

b. The AVN must, for facility-level reconfiguration, permit the reconfiguration of individual sectors within the facility.

c. The AVN must, for facility-level reconfiguration, permit the reconfiguration of individual positions within the facility.

d. The AVN must, for facility-level reconfiguration, permit the initiator to indicate those areas within a facility that are to be reconfigured.

e. The AVN must, for facility-level reconfiguration, permit the initiator to indicate those sectors within a facility that are to be reconfigured.

f. The AVN must, for facility-level reconfiguration, permit the initiator to indicate those positions within a facility that are to be reconfigured.

g. The AVN must, for facility-level reconfiguration, ensure that only those positions within the facility whose position map is changing are reconfigured unless the reconfiguration is forced.

h. The AVN must, for facility-level reconfiguration, retain the current configuration in effect for positions that are unaffected by the facility reconfiguration.

i. The AVN must, for facility-level reconfiguration, permit the reconfiguration initiator to force reconfiguration to any configurable device.

3.1.6.5.5 Invocation of Reconfiguration

a. The AVN workstation must permit authorized personnel to invoke reconfiguration maps by selecting an available map.

b. The AVN must, if the maps are valid, initiate the reconfiguration.

c. The AVN must ensure that each position with reconfiguration authority has the scope of its reconfiguration authority defined by classmark.

d. The AVN must examine reconfiguration maps before initiating them to ensure that they are valid (e.g., file may be corrupted or may call for resources that are not installed or are excluded from the physical configuration file).

e. The AVN must, if errors are found, report them to the initiating operator and suspend the reconfiguration process without affecting any system resources, and prompt operator to terminate or continue process. Continue reconfiguration and report errors to authorized personnel.

f. The AVN must ensure that any offline data base is validated prior to permitting it's transition to online.

g. The NVS must provide the reconfiguration status to the initiating workstation and all affected workstations.

h. The AVN must, after resources availability is verified, reserve the required resources to complete the reconfiguration and/or permit cancellation of the reconfiguration (i.e., return to the previous operational configuration).

i. The AVN must prevent the interruption of service during reconfiguration on those positions and external interfaces not affected by the reconfiguration.

j. The AVN must ensure that reconfiguration process does not disconnect any established call at the position.

k. The AVN must ensure that reconfiguration process does not disconnect any A/G call associated with an activated PTT device.

l. The AVN must, for the download stage of the reconfiguration process, send the reconfiguration data to all affected positions.

m. The AVN must ensure that the download stage does not impact alarm reporting.

n. The AVN must ensure that the download stage does not impact any ATC operations.

o. The AVN must provide confirmation that the download stage completed to the initiating workstation.

p. The AVN must, if the download stage fails, provide to the initiating workstation an indication of the errors.

q. The AVN must provide the initiating workstation the option to continue the reconfiguration.

r. The AVN must provide the initiating workstation the option to cancel the reconfiguration

s. The AVN must require input from the initiating workstation to continue the reconfiguration.

t. The AVN must require input from the initiating workstation to cancel the reconfiguration.

u. The AVN must, if the reconfiguration cancel option is selected, cancel the reconfiguration.

v. The AVN must, if the reconfiguration continue option is selected, for positions that require reconfiguration acknowledgement, indicate at all affected positions that a new configuration is available.

w. The AVN must, if the reconfiguration continue option is selected and position reconfiguration acknowledgement is not required, complete the reconfiguration.

x. The AVN must, for any reconfiguration that affects positions and frequencies using cross coupling, automatically disable any active cross-coupling at the affected positions.

y. The AVN must, during reconfiguration, for each frequency added to a position, set transmit and receive selectors to the initial (startup) state.

3.1.6.5.5.1 Reconfiguration Status

a. The AVN must only report the completion of the preparation (i.e., download stage) of reconfiguration process to the initiating workstation.

b. The AVN must permit the initiating workstation to request a report of the current status of each reconfiguration in progress.

c. The AVN must permit the any workstation to request a report of the current status of each reconfiguration in progress.

d. The AVN must, at a minimum, provide the following reconfiguration status:

(1) The AVN must provide the reconfiguration status, Reconfiguration initiated.

(2) The AVN must provide the reconfiguration status, Reconfiguration in progress.

(3) The AVN must provide the reconfiguration status, Reconfiguration completion pending release of calls in progress.

(4) The AVN must provide the reconfiguration status, Reconfiguration complete.

(5) The AVN must provide the reconfiguration status, Reconfiguration fault/failure.

(6) The NVS must provide the reconfiguration status, Reconfiguration resource violations.

3.1.6.5.5.2 Recovery

a. The AVN must ensure that the recovery from a failure of an element used by the reconfiguration process is automatic when a redundant element is available.

b. The AVN must permit the reconfiguration process to automatically retry two times from the last logical step successfully completed, before requiring for manual recovery.

c. The AVN must permit the initiator of the reconfiguration to initiate recovery procedures.

d. The AVN must permit other classmarked workstations to initiate recovery procedures.

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e. The AVN must permit the use of manual recovery methods to recover from any failure of the reconfiguration process.

f. The AVN must, at a minimum, include manual recovery by canceling a reconfiguration request prior to completion.

g. The AVN must, at a minimum, include manual recovery by retry of a canceled reconfiguration after failure correction.

3.1.6.5.5.3 Priority of Reconfiguration Commands

a. The AVN must ensure that a facility-level reconfiguration command has priority over any lower level reconfiguration command.

b. The AVN must, when multiple reconfigurations are requested, ensure they are performed simultaneously according to priority.

c. The AVN must, when multiple reconfigurations are requested, ensure they are queued according to priority.

d. The AVN must, when multiple reconfigurations are requested, ensure they are canceled according to priority.

e. The AVN must permit multiple reconfigurations where no positions are affected by more than one requested reconfiguration to be performed simultaneously.

f. The AVN must ensure that the priority in processing reconfiguration commands determine by assigned reconfiguration priority level..

g. The AVN must provide at least five reconfiguration priority levels with level 1 having the highest priority.

h. The AVN must ensure the following rules determine the priority when one or more positions are affected by more than one requested reconfigurations: Note: Reconfiguration Preparation (Stage 1) and Reconfiguration Execution (Stage 2)

(1) The AVN must ensure that a higher priority reconfiguration cancels a previously initiated lower priority reconfiguration that is not in stage 2.

(2) The AVN must, if the reconfiguration is in stage 2, ensure that the higher priority reconfiguration waits until the lower priority reconfiguration completes before proceeding.

(3) The AVN must ensure that a requested lower priority reconfiguration is rejected if a previously requested higher priority reconfiguration is in either stage 1 or 2.

(4) The AVN must, for overlapping reconfigurations of equal priority, complete the reconfiguration in the order they are requested, whether in stage 1 or 2.

(5) The AVN must ensure duplicate reconfigurations are rejected by the system regardless of the level of the initiator.

(6) The AVN must, for reconfiguration requests made by operators of the same level, are assigned the following priority by the system: facility, area, sector, and then position.

(7) The AVN must ensure that LTP reconfigurations wait until the completion of any logical overlapping reconfigurations initiated by authorized personnel of the same level.

(8) The AVN must reject the second of two overlapping LTP reconfigurations initiated by authorized personnel of the same level.

3.1.6.5.5.4 <u>Reconfiguration Timing</u>

a. The AVN must determine reconfiguration timing requirements based on a two-stage reconfiguration process. The time to reconfigure excludes delays caused by positions involved in an active call.

b. The AVN must exclude from these timelines, logical reconfigurations of a position(s) which have temporary modifications in effect.

c. The AVN must, for the purpose of calculating the allowed reconfiguration timing requirement, only count positions whose position maps are changed via the reconfiguration.

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d. The AVN must include the time required to perform any on-line validation necessary to ensure successful completion of the reconfiguration in the measurement of reconfiguration times.

e. The AVN must require no more than one minute to prepare reconfiguration data, measured from the time reconfiguration is invoked by the operator to the time that the NVS requests the first position acknowledgment of reconfiguration (or to the time that the NVS performs the reconfiguration, for resources that do not require acknowledgment.

f. The AVN must, unless otherwise classmarked, interrupt service for no more than two seconds at each position being reconfigured, measured from the time the operator acknowledges reconfiguration to the time the new configuration is ready for use.

TABLE 3-3. Reconfiguration Process

Stage	Process Description	Time to Invoke
1	Prepare configuration data, send to position, report errors, and display continue/cancel message (download stage)	1 minute
	Acknowledge confirmation to RECON enable Ready	5 seconds
2	Execute RECON enable to position available for use	1 second

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3.1.6.5.5.4.1 Two-Step Reconfiguration Timing

a. The AVN must allow reconfiguration of communications resources to be performed in two separate steps, reconfiguration preparation (Stage 1) and reconfiguration execution (Stage 2).

b. The AVN must consider the specified time period for Stage 1 to start when the initiator completes the reconfiguration preparation command.

c. The AVN must consider the specified time period for Stage 1 to end when the initiator receives status indicating that reconfiguration preparation is complete for all affected positions.

d. The AVN must consider the specified time period for Stage 2 to start when the initiator completes the reconfiguration execution command.

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e. The AVN must consider the specified time period for Stage 2 to end when the initiator receives status indicating that the reconfiguration is complete for all affected positions.

f. The AVN must, after receiving the reconfiguration preparation command, prepare the requested connectivity for implementation.

g. The AVN must, after the NVS receives the reconfiguration preparation command, execute the requested reconfiguration.

h. The AVN must ensure that the timing for reconfiguration preparation and reconfiguration execution do not exceed the times specified in TABLE 3-3.

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i. The AVN must ensure that the timing for reconfiguration is not exceeded when under the traffic loads specified in TABLE 3-6 and TABLE 3-7.

j. The AVN must ensure that during reconfiguration a position is not without functional communications for more than 1 second under the traffic loads specified in TABLE 3-6 and TABLE 3-7.

3.1.6.5.5.5 Reconfiguration Limitation

3.1.6.5.5.5.1 Limitation of Logical Reconfiguration

a. The AVN must ensure that the remaining frequencies, those frequencies at the position prior to the reconfiguration, retain the states previously selected by the position operator prior to the reconfiguration, including voice routing selections.

b. The AVN must ensure that all other position-selectable options remain in the identical state in effect at the logical position prior to the reconfiguration.

3.1.6.5.5.5.2 Limitations of Logical-to-Physical (LTP) Reconfigurations

a. The AVN must, for positions whose physical console assignment is changed (i.e., those logical positions moved to a different position via an LTP reconfiguration), regardless of whether the logical position is concurrently logically reconfigured, ensure that the settings specified in 3.1.6.5.5.5.5 apply.

b. The AVN must, for LTP reconfigurations, ensure that all frequencies default to transmitter off, receiver on, and a contractor-selected voice routing default.

c. The AVN must, for LTP reconfigurations, ensure that all voice call DAs default to voice page on.

3.1.6.5.5.5.3 Call Forwarding Limits for Reconfiguration

a. The AVN must ensure that call forwarding between positions remains intact between the original logical positions under a logical-to-physical (LTP) reconfiguration in which the logical source and/or the logical destination are moved physically.

b. The AVN must ensure that call forwarding remain intact if the destination position is logically reconfigured.

c. The AVN must ensure that call forwarding is not retained during reconfigurations which alter the source position's logical identity.

3.1.6.5.5.5.4 Voice Monitoring Limits for Reconfiguration

a. The AVN must ensure that voice monitoring between positions remain intact between the original logical positions under a LTP reconfiguration in which the logical source and/or the logical destination are moved physically.

b. The AVN must ensure that voice monitoring remain intact if the monitored position is logically reconfigured.

c. The AVN must ensure that voice monitoring is not retained during reconfigurations which alter the monitoring position's logical identity.

3.1.6.5.5.5.5 Unmapped Position Functional Settings for Reconfiguration

a. The AVN must, for physical consoles going to an unmapped state, ensure the settings for the unmapped console are per TABLE 3-4.

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TABLE 3-4. Unmapped Position Functional Settings for Reconfiguration

Page Display	Utility Screen
G/G Voice Routing:	LS for OVR, LS for Non-OVR
Keyclick:	OFF
Auto Xfer:	ON
R/T Function:	OFF
Sidetone Volume:	Maximum
Tone Volumes:	Medium (applies to all volumes set via the Interactive System Tones and OVR Tone displays)
HS/LS Volume:	Previously selected level
Chime State and Volume:	Previously selected state and level
Display Brightness Setting:	Previously selected level

3.1.6.5.5.5.6 A/G System States for Reconfiguration

a. The AVN must, for any reconfiguration, ensure that BUEC, main/standby selection, remote mute, and cross-couple for each frequency remain in the current system state.

b. The AVN must ensure that reconfiguration of a position with the capability to select a frequency site for site group maintenance removes the frequency site(s) from site group maintenance.

c. The AVN must ensure that a frequency site(s) displays the site group maintenance status after a reconfiguration.

3.1.6.5.5.5.7 Simultaneous Reconfiguration

a. The AVN must permit simultaneous execution of non-overlapping position-level, sector-level, and area-level reconfigurations and changes to the physical console assignment.

b. The AVN must ensure that simultaneous reconfigurations of the same positions are prohibited.

3.1.6.5.5.6 Acknowledgement of Reconfiguration

a. The AVN must ensure that call forwarding to the position remains in effect after the reconfiguration has been accepted.

b. The AVN must, unless otherwise classmarked, require no operator acknowledgment to reconfigure any position including an unattended positions.

c. The AVN must, for unattended positions with call forwarding in effect and, as controlled by classmark, provide visual indications of pending reconfiguration at the unattended position.

d. The AVN must, for unattended positions with call forwarding in effect and as controlled by classmark, require insertion of a HS instrument into the jacks of the position to complete the reconfiguration of the position.

e. The AVN must, for unattended positions with call forwarding in effect and as classmarked, require the operator to signal positive acknowledgment before reconfiguring the position.

3.1.6.6 Maintenance Functions

3.1.6.6.1 Traffic Simulation

a. The AVN must permit authorized personnel to designate, for each position, which positions support the traffic simulation capability.

3.1.6.6.2 AGC Enable/Disable

a. The AVN must permit authorized personnel to enable position transmit AGC through reconfiguration.

b. The AVN must permit authorized personnel to disable position transmit AGC through reconfiguration.

c. The AVN must permit authorized personnel to select the position transmit AGC value through reconfiguration.

d. The AVN must permit authorized personnel to enable radio interface receive AGC through reconfiguration.

e. The AVN must permit authorized personnel to disable radio interface receive AGC through reconfiguration.

f. The AVN must permit authorized personnel to enable trunk receive AGC through reconfiguration.

g. The AVN must permit authorized personnel to disable trunk receive AGC through reconfiguration.

3.1.6.6.3 Tone Notching Enable/Disable

a. The AVN must permit authorized personnel to enable tone notching for any position through reconfiguration.

b. The AVN must permit authorized personnel to disable tone notching for any position through reconfiguration.

c. The AVN must ensure that the tone notching feature can only be disabled when the position is in maintenance busy.

3.1.6.6.4 Maintenance Mode Operations

a. The AVN must ensure the resources classified as maintenance busy are available for use by only other resources classified as maintenance busy.

b. The AVN must permit only the position(s) classmarked as a maintenance position to access both online and maintenance busy resources.

c. The AVN must permit authorized personnel to reconfigure resource(s) in the maintenance busy state.

d. The AVN must permit authorized personnel to assign maintenance busy resource(s) in position maps.

e. The AVN must permit authorized personnel to run diagnostics on resource classified as maintenance busy state .

f. The AVN must permit authorized personnel to individually assign the maintenance busy state to redundant elements.

g. The AVN must, when a site of a multiple site group is assigned the maintenance busy state, remove the selected site from the site group.

h. The AVN must, when the maintenance busy state is removed from the site of a multiple site group, reinstate the site back into the site group.

i. The AVN must, when any device is classified as maintenance busy, suppress alarms but not diagnostics.

j. The AVN must, when a position is in maintenance busy, prohibit voice monitoring of the position.

k. The AVN must, when a position is being voice monitored and that position is placed in maintenance busy, disable voice monitoring.

l. The AVN must, when a position is in maintenance busy, prohibit initiation of call forward from the position.

m. The AVN must, when a position is in maintenance busy, prohibit call forwarding to the position from any other position(s).

n. The AVN must, if call forwarding is enabled at position that is placed in maintenance busy, disable call forward.

o. The AVN must, when a position is in receipt of forwarded calls and is placed in maintenance busy, disable call forward.

p. The AVN must, when any device is classified as maintenance busy, provide a unique indication to affected position(s) indicating that the device is unavailable.

q. The AVN must, when any device is classified as maintenance busy, provide a unique indication to affected workstation(s) indicating that the device is unavailable.

r. The AVN workstation must permit authorized personnel to reinstate any device back into service.

3.1.6.7 HS Jack Volume Limiter

a. The AVN workstation must permit authorized personnel to designate by position classmark the HS Jack Volume Limiter value through reconfiguration.

3.1.6.8 Remote Resource Access

a. The NVS must be designed to allow A/G communications resources of one facility to be re-routed or re-assigned to other facilities as determined by authorized personnel.

b. The NVS must be designed to allow G/G communications resources of one facility to be re-routed or re-assigned to other facilities as determined by authorized personnel.

c. The NVS must, on the authority of authorized personnel, permit ATC communications responsibilities to be temporarily offloaded to one or more alternate facilities.

d. The NVS must permit the reassignment of resources (i.e., positions and radios) across facility boundaries.

e. The NVS must, for remote resource access, meet the security requirements in section 3.1.3

3.1.6.8.1 Access Control

a. Each NVS must allow at least 12 remote workstations/users simultaneous access to the local facility.

b. The NVS must require an additional authentication sequence to grant uncoordinated access and control across the facility boundary.

c. The NVS must, at classmarked workstations, provide a continuous visual indication of which receivers that are shared across the facility boundary are not being monitored.

3.1.7 Time Source

a. The AVN must have an internal time-of-day reference clock.

b. The RRN must have an internal time-of-day reference clock.

c. The NVSMS must have an internal time-of-day reference clock.

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d. The NVS must have time source synchronization at all NVS nodes through the use of Network Time Protocol (NTPv4).

e. The NVS must provide all time in UTC as specified within NTPv4.

f. The NVS must provide a time-of-day reference that maintains year, month, day, hour, minute and second.

g. The NVS must allow authorized personnel to manually enter or change time of day at each NVS node.

h. The NVS must, at a minimum, synchronize internal clocks every 24 hours with a common time source

i. The NVS must synchronize all nodes to less than or equal to 100 msec of the NTP time source in accordance with paragraph 3.2.1.2.8.4 of NAS-SS-1000 .

j. The NVS must have each node maintain its own time-of-day in the absence of the external time source input by having a maximum frequency drift not to exceed 2 seconds in a 24 hour period.

3.1.8 System Expansion

3.1.8.1 General Requirements

a. The NVS must be expandable up to its maximum size as specified in paragraph 3.5.2.

b. The AVN must be expandable in incremental modules of one position at a time.

c. The NVS must be expandable in incremental modules of one external interface at a time.

d. The NVS must ensure that all expansion modules are connectorized.

e. The NVS must be designed to allow trained government personnel using only common tools, without wire wrap or soldering, to install expansion modules.

f. The NVS must be designed to allow trained government personnel using only common tools, without wire wrap or soldering, to remove expansion modules.

g. The NVS must ensure that all software changes are performed by authorized personnel.

h. The NVS must ensure, to the extent that software changes are required to affect system expansion, that they are limited to the editing or substitution of static data such as maps, tables, or files, and not executable software.

i. The NVS must ensure, to the extent that software changes are required to affect physical reconfiguration, that they are limited to the editing or substitution of static data such as maps, tables, or files, and not executable software.

j. The NVS must ensure, to the extent that software changes are required to affect system size reduction, that they are limited to the editing or substitution of static data such as maps, tables, or files, and not executable software.

k. The NVS must, to the extent that software changes are required to affect system expansion, permit software changes to be accomplished on site by authorized personnel through reconfiguration.

l. The NVS must, to the extent that software changes are required to affect physical reconfiguration, permit software changes to be accomplished on site by authorized personnel through reconfiguration.

m. The NVS must, to the extent that software changes are required to affect system size reduction permit software changes to be accomplished on site by authorized personnel through reconfiguration.

n. The NVS must require no more than 60 minutes of clock time for trained personnel to install, excluding carpentry, cable pulling, administrative activities and logistical activities, any expansion module.

o. The NVS must require no more than 60 minutes of clock time for trained personnel to remove, excluding carpentry, cable pulling, administrative activities and logistical activities, any expansion module.

p. The AVN must prohibit the process for installation of a position to restrict operations at other positions, except for testing of resources appearing at more than one position.

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q. The AVN must prohibit the process for reconfiguration of a position to restrict operations at other positions, except for testing of resources appearing at more than one position.

r. The AVN must prohibit the process for removal of a position to restrict operations at other positions, except for testing of resources appearing at more than one position.

s. The NVS must prohibit the process for installation of an external interface to restrict operations of other external interfaces.

t. The NVS must prohibit the process for reconfiguration of an external interface to restrict operations of other external interfaces.

u. The NVS must prohibit the process for removal of an external interface to restrict operations of other external interfaces.

v. The NVS must ensure that only resources in the offline state are permitted to be removed from the data base through reconfiguration.

w. The NVS must ensure that each device installed in the NVS initializes to the offline mode.

3.1.8.2 Position Installation and Removal

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a. The AVN must permit authorized personnel to designate any position identifier through reconfiguration.

b. The AVN must permit authorized personnel to assign the code to be used for access to each position through reconfiguration.

c. The AVN must permit authorized personnel to designate any position configuration options through reconfiguration.

d. The AVN must permit authorized personnel to remove any operational position through reconfiguration.

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3.1.8.3 G/G Circuit Interfaces Installation, Reconfiguration and Removal

a. The AVN must permit authorized personnel to install new G/G circuit interface(s) in the system for operational use through reconfiguration.

b. The NVS must permit authorized personnel to define the configuration of each G/G circuit interface in accordance with the NVS to Analog Interphone IRD through reconfiguration .

c. The AVN must permit authorized personnel to define the label displayed on each DA selector assigned to provide access to each G/G circuit interface through reconfiguration.

d. The AVN must permit authorized personnel to assign the IA code used to access each G/G circuit interface through reconfiguration.

e. The AVN must permit authorized personnel to assign each supervised G/G circuit interface into a trunk group through reconfiguration.

f. The AVN must permit authorized personnel to remove any supervised G/G circuit interface from a trunk group through reconfiguration.

g. The NVS must permit authorized personnel to assign a classmark indicating the direction (incoming, outgoing, two-way) of each trunk group through reconfiguration.

h. The NVS must permit authorized personnel to assign an override classmark to each trunk group through reconfiguration.

i. The NVS must permit authorized personnel to assign a non-override classmark to each trunk group through reconfiguration.

j. The NVS must permit authorized personnel to assign the IA code for access to each trunk group.

k. The NVS must permit authorized personnel to remove G/G circuit interfaces through reconfiguration.

3.1.8.4 A/G Interfaces

a. The NVS must permit authorized personnel to install new A/G interfaces in the system for operational use through reconfiguration.

b. The NVS must permit authorized personnel to define the configuration of each A/G interface in accordance with the NVS Radio Subsystem IRD through reconfiguration.

c. The NVS must permit authorized personnel to define the label displayed on each frequency selector assigned to provide access to each A/G interface(s) through reconfiguration.

d. The NVS must permit authorized personnel to adjust audio levels of A/G interfaces in accordance with the NVS Radio Subsystem IRD through reconfiguration .

e. The NVS must permit authorized personnel to assign, to each interlocked trunk, A/G frequency identification.

f. The NVS must permit authorized personnel to assign to each interlocked trunk preempting or non-preempting configuration.

g. The NVS must permit authorized personnel to assign to the interlocking trunk an A/G frequency identification.

h. The NVS must permit authorized personnel to assign to the interlocking trunk the preempting or non-preempting configuration.

i. The NVS must permit authorized personnel to designate each RCE interface as non-preemptive.

j. The NVS must permit authorized personnel to designate each RCE interface as dual control operation with PTT lockout.

k. The NVS must permit authorized personnel to designate each RCE interface as dual control with PTT preemption.

l. The NVS must permit authorized personnel to designate each RCE interface as dual control with preemptable PTT.

m. The NVS must permit authorized personnel to remove A/G interfaces through reconfiguration.

3.1.8.5 Other Interfaces

3.1.8.5.1 Door Release

a. The AVN must permit authorized personnel to connect government furnished door release solenoids for operation by the NVS.

b. The AVN must permit authorized personnel to connect government furnished door-open contacts for operation by the NVS.

c. The AVN must permit authorized personnel to define the label displayed on each door release selector assigned to provide access to door release interface(s) through reconfiguration.

d. The AVN must permit authorized personnel to remove door release interfaces through reconfiguration.

3.1.8.5.2 Workstations

a. The NVS must permit authorized personnel to install new workstation(s) in the system for operational use through reconfiguration.

b. The NVS must permit authorized personnel to relocate workstation(s) in the system for operational use through reconfiguration.

c. The NVS must permit authorized personnel to define the configuration of each workstation through reconfiguration.

d. The NVS must permit authorized personnel to remove workstation(s) through reconfiguration.

3.1.8.5.3 System Printers

a. The NVS must permit authorized personnel to install new printer(s) in the system for operational use through reconfiguration.

b. The NVS must permit authorized personnel to relocate printer(s) in the system for operational use through reconfiguration.

c. The NVS must permit authorized personnel to define the configuration of each printer through reconfiguration.

d. The NVS must permit authorized personnel to remove printer(s) through reconfiguration.

3.1.9 Legal Recording

3.1.9.1 Radio Interface Recording

a. The AVN must provide connectivity to a government furnished voice logging recorder to record all audio to and from each RCE interface.

b. The AVN must, for purposes of legal recording, combine the audio provided to the on-line transmitter (main or standby) and the on-line receiver (main or standby) associated with the frequency onto a single connection.

c. The AVN must permit authorized personnel to define each radio record interface through reconfiguration.

d. The AVN must permit authorized personnel to remove radio record interface(s) through reconfiguration.

3.1.9.2 G/G Circuit Interface Recording

a. The AVN must provide connectivity to a government furnished voice logging recorder to record all audio to and from each G/G circuit interface.

b. The AVN must, for purposes of legal recording, combine the audio to and from the G/G circuit interface onto a single connection.

c. The AVN must permit authorized personnel to define each G/G circuit record interface through reconfiguration.

d. The AVN must permit authorized personnel to remove G/G circuit record interface(s) through reconfiguration.

3.1.9.3 Position Recording

a. The AVN must provide connectivity to a government-furnished voice logging recorder to record all incoming and outgoing audio at the position, excluding incoming call alert signaling.

b. The AVN must provide up to two recorder channels at each position as ordered by the government.

c. The AVN must, if only one recorder channel is ordered, ensure that the channel records all A/G communications, and G/G communications including the position briefing on all circuits entering and leaving the position.

d. The AVN must, if two recorder channels are ordered, provide one recorder channel that only records all incoming and outgoing A/G communications at the position.

e. The AVN must, if two recorder channels are ordered, provide one recorder channel that only records all incoming and outgoing G/G communications and position relief briefing at the position.

f. The AVN must, for each position not in relief brief mode, provide to the legal recorder the audio signal furnished to the LS after volume control, excluding the chime, but including the voice alert onto a single interface.

g. The AVN must, for each position not in relief brief mode, provide to the legal recorder the audio signal furnished to the headset earpiece after the volume control and amplitude limitation without position provided sidetone of the highest priority HS jack occupied as follows: primary instructor (highest priority), primary trainee, secondary instructor, secondary trainee (lowest priority), onto a single interface.

h. The AVN must, for each position not in relief brief mode, provide to the legal recorder the audio signal furnished by the position to called party onto a single interface.

i. The AVN must, for each position having relief brief mode active, provide to the legal recorder the audio signal furnished to the LS after volume control, excluding chime, but including the voice alert onto a single interface.

j. The AVN must, for each position having relief brief mode active, provide to the legal recorder the microphone audio of each occupied jack HS device or handheld microphone, onto a single interface.

k. The AVN must, upon activation of position split functionality mode operations, ensure that one recorder channel separately record voice signals of the HS jack module dedicated to G/G communications, and the other recorder channel record voice signals of the HS jack module dedicated to A/G communications.

3.1.10 Status Monitoring and Control

a. The NVS must provide monitoring of real-time system status to the classmarked workstation(s).

b. The NVS must provide reporting of system status and failures to the classmarked workstation(s).

c. The NVS must permit authorized access levels to specify the recipient(s) of status reporting on a LRU basis.

d. The NVS must ensure that the status monitoring and control functions are consistent with the reliability and maintainability requirements in sections 3.4.1 and 3.4.3.

e. The NVS must ensure that the results from BIT and indication of equipment failures are provided for display at the workstations authorized to receive the information.

f. The NVS must ensure that the results from BIT of equipment are logged.

g. The NVS must ensure the results of error detection and correction on data paths are reported.

h. The NVS must ensure the results of error detection and correction on data paths are logged.

i. The NVS must monitor the data communications interfaces to external systems.

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3.1.10.1 Reports to Classmarked Workstations

a. The NVS must ensure that system status is updated at a 5-second periodic rate.

b. The NVS must, in the event of a failure, display and identify the failed equipment and its relationship to the system.

c. The NVS must, in the event of a failure, display the resources used to maintain the level of availability.

d. The NVS must provide aural and visual alarms indicating the failure status of equipment and interfaces.

e. The NVS must ensure that failures are categorized, prioritized, and stamped with time of detection in terms of Universal Time Coordinated (UTC).

3.1.10.2 Front Panel Controls and Indicators

3.1.10.2.1 RRN Controls and Indicators

a. The RRN must provide front panel controls for PTT assertion for frequency.

b. The RRN must provide front panel controls for main/standby transmitter selection.

c. The RRN must provide front panel controls for main/standby receiver selection for each frequency.

d. The RRN must provide front panel controls for primary/backup trunk usage.

e. The RRN must provide front panel controls for loopbacks, local and remote.

f. The RRN must provide front panel controls for 1008Hz tone generation for local and remote audio.

3.1.10.2.1.1 Radio Status Indicators

a. The RRN must provide visual front panel status indicators for PTT for each frequency.

b. The RRN must provide visual front panel indicators for PTT confirmation for each frequency.

c. The RRN must provide visual front panel status indicators for main/standby transmitter selection for each frequency.

d. The RRN must provide visual front panel status indicators for main/standby receiver selection for each frequency..

e. The RRN must provide visual front panel status indictors for squelch break for each frequency.

f. The RRN must provide visual front panel status indictors for lockout for each frequency.

g. The RRN must provide visual front panel status indictors for mute confirmation for each frequency.

h. The RRN must provide visual front panel status indicators for loopbacks, local and remote.

i. The RRN must provide visual front panel status indicators for tone generation.

3.1.10.2.1.2 Link Status Indicators for RCE Emulation

a. The RRN must provide a front panel indicator for link status of each RCE channel.

b. The RRN must provide a front panel "link status" indicator that denotes the current link status for each RCE channel.

(1) The RRN must provide a unique indication of successful modem communication on active trunk(s) to the far end RCE.

(2) The RRN must provide a unique indication of no communication to the far end RCE.

(3) The RRN must provide a unique indication of one trunk of the two active trunks to the far end RCE.

c. The RRN must provide a unique front panel indication to indicate that the audio power is above the selected VOX threshold on audio input ports for each RCE channel.

d. The RRN must provide a unique front panel indication to indicate that a RCE workstation message is being processed.

e. The RRN must provide a unique indication of front panel controls not asserted for each RCE channel.

f. The RRN must provide a unique indication of front panel controls asserted for each RCE channel.

g. The RRN must provide a unique front panel indication of successful communications, no errors for each RCE channel.

h. The RRN must provide a front panel status indicator that denotes the current status of the RCE channel; no error detected and/or error detected.

(1) The RRN must indicate if the detected error is in the RRN.

(2) The RRN must indicate if the detected error is in the remote unit.

(3) The RRN must indicate if the detected error is in both RRN and remote unit.

i. The RRN must provide a unique indication when any of the previously down RCE trunks recovers.

3.1.10.3 Graphical User Interface (GUI)

3.1.10.3.1 Radio GUI

3.1.10.3.1.1 General

a. The NVS must provide a radio control GUI that allows the operator to monitor and manage the controls and indicators for the AVN.

b. The NVS must provide a radio control GUI that allows the operator to monitor and manage the controls and indicators for the RRN.

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c. The NVS must provide a radio control GUI that allows the operator to monitor and manage the features currently supported by the legacy RCE Centralized Maintenance System (CMS).

d. The NVS must provide a radio control GUI that allows the operator to monitor and manage the features currently supported by the legacy RCE Maintenance Data Terminal (MDT).

e. The NVS must provide radio control GUI that is able to monitor a minimum of 1000 radios.

f. The NVS must provide a radio control GUI that displays control signal status indications (M/S, Trunk in use, PTT, activity…).

g. The NVS must provide a GUI that permits configuration and control of the RRN functions by authorized access levels.

h. The NVS must provide a radio control GUI that permits the RRN front panel maintenance functions to be enabled.

i. The NVS must provide a radio control GUI that permits the RRN front panel maintenance functions to be disabled.

3.1.10.3.1.2 Site Adaptation

a. The NVS must provide a radio control GUI that allows Primary/Backup site configurations.

b. The NVS must provide a radio control GUI that allows Dual Control site configurations.

c. The NVS must provide a radio control GUI that allows Separate Radio site configurations.

d. The NVS must provide a radio control GUI that allows Separate Voice/Data site configurations.

e. The NVS must provide a radio control GUI that allows BUEC/ECS site configurations.

f. The NVS must provide a radio control GUI that supports the legacy RCE Versatile Alarm Monitoring (VAM).

3.1.11 NVS Management System (NVSMS)

a. The NVSMS must allow dynamic definition of the type and content of reports presented to the user.

3.1.11.1 Monitoring and Control

a. The NVSMS must, at a minimum, support all the function as defined in sections 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.10.

b. The NVSMS must be functionally independent of other NVS fundamental elements, such that the loss of NVSMS network connectivity will not impact local operations of AVNs and RRNs.

c. The NVSMS must be upgradeable without impacting operation of AVNs, RRNs, position and workstation equipment.

d. The NVSMS must receive indications of active configurations in use at any NVS fundamental element.

3.1.11.2 Performance Management

a. The NVSMS must, at a minimum, provide the following network performance statistics.

b. The NVSMS must provide bandwidth utilization

c. The NVSMS must provide throughput latency

d. The NVSMS must provide error counts

e. The NVSMS must provide redundancy path operational status

f. The NVSMS must provide packet loss information

g. The NVSMS must provide validation of communication connectivity (i.e., heartbeat) between all defined NVS devices to the NVSMS.

h. The NVSMS must provide a heartbeat check to all defined NVS devices based on a user configurable time interval.

i. The NVSMS status update interval must be configurable from five minutes to 30 minutes in increments of one minute.

j. The NVSMS must perform management of capacity.

k. The NVSMS must perform resource analysis.

l. The NVSMS must provide performance controls.

3.1.11.3 Account Management

a. The NVSMS administrator must determine the level of access to NVSMS functions based on user roles.

b. The NVSMS administrator must be permitted to reset authorized personnel identification and passwords of any NVS user.

3.1.11.4 Configuration Management

a. The NVSMS must monitor and assign all network access addresses to each NVS.

b. The NVSMS must assign a group of network access addresses for the NVS.

c. The NVSMS must maintain a log of all available network access addresses that are assignable to the NVS.

d. The NVSMS must maintain a log of all assigned network access addresses by the NVS.

3.1.11.4.1 Modeling and Simulation

a. The NVSMS must be permitted to request a copy of any NVS facility's data base for editing.

b. The NVSMS must be permitted to request a copy of any NVS facility's data base for creation of a new/changed data base.

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c. The NVSMS must provide data base modeling tools to support offline data base creation.

d. The NVSMS must provide data base simulation tools to support offline data base validation.

3.1.11.4.2 Baseline Management

a. The NVSMS must provide hardware/firmware baseline configuration control of NVS devices.

b. The NVSMS must provide configuration status accounting of NVS devices.

c. The NVSMS must provide software baseline management of NVS devices.

3.1.11.5 Security Management

a. The NVSMS must, at a minimum, meet the security requirements defined in section 3.1.3 herein.

3.1.11.6 Graphical User Interface (GUI)

a. The NVSMS must provide a GUI that displays a graphical representation and list of all NVS facilities defined in the network.

b. The NVSMS must provide a GUI that permits the creation and definition of subgroups.

c. The NVSMS must provide a GUI that displays a summary of the status of each NVS defined in the subgroup.

d. The NVSMS must provide a GUI that permits the operator to select any displayed NVS facility from the subgroup.

e. The NVSMS must provide a GUI for RCE emulation control.

f. The NVSMS must provide a GUI for RCE emulation status.

g. The NVSMS must provide a GUI , that for the selected facility, displays the real-time status.

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h. The NVSMS must provide a GUI that permits the performance of the maintenance and testing capabilities defined in section 3.1.4.

i. The NVSMS must provide a GUI that permits the performance of the reporting capabilities defined in section 3.1.10.

3.1.11.7 Data Management System

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a. The NVS must provide a minimum of two data management systems, locations to be determined by the government, to store all NVS facility configuration data, event log, traffic log and maintenance log data.

b. The NVS must ensure that all data management systems are synchronized.

c. The NVS must support user defined synchronization schedules.

d. The NVS must support minimum synchronization intervals of 12 hours.

e. The NVS must support maximum synchronization intervals of 48 hours.

f. The NVS must support synchronization intervals in one hour increments.

g. The NVS must permit user requested synchronization on demand.

h. The NVS must permit authorized access levels to archive data management system data.

i. The NVS must ensure that providing updates to the data management system does not impact ATC communications.

j. The NVS must ensure that access to the data management system meets the security requirements specified in section 3.1.3.

k. The NVS must ensure that the data management system meets the human factors requirements specified in section 3.5.3.

3.1.11.7.1 Data Management System Update and Recovery

a. The NVS must support user defined configuration and log data upload schedules.

b. The NVS must support minimum configuration and log data upload intervals of 1 hour.

c. The NVS must support maximum configuration and log data upload intervals of 48 hours.

d. The NVS must support configuration and log data upload intervals in one hour increments.

e. The NVS must permit configuration and log data upload from each NVS element to the data management system on demand.

f. The NVS must permit configuration data download to each NVS element from the data management system on demand.

g. The NVS must ensure that any configuration data received from the data management system does not overwrite the active data base.

h. The NVS must permit configuration and log data to be downloaded to a workstation for analysis from the data management system on demand.

i. The NVS must, for any upload/download operation to/from the data management system, create a record of the operation in the maintenance log.

j. The NVS must, for any failed upload/download operation to/from the data management system, create a record of the operation in the maintenance log and send an alert to the NVSMS.

k. The NVS must, for any failed upload/down operation to/from the data management system, create a record of the operation in the maintenance log and send an alert to the affected facility, as defined by authorized access levels.

l. The NVS must, for any failed upload/down operation to/from the primary data management system, attempt to send the information to the user identified data management system backup.

3.1.12 Numbering Plan

a. The NVS must define a comprehensive numbering plan subject to FAA approval.

b. The NVS numbering plan must emphasize simplicity and speed of dialing.

c. The NVS numbering plan must include access to all operational positions at any facility.

d. The NVS numbering plan must include minimum-length number sequence adequate for proposed facility sizing.

e. The NVS numbering plan must include abbreviated "dialing" for frequently used PSTN and interfacility calls.

f. The NVS numbering plan must include access to IA control functions.

g. The NVS numbering plan must include access to functions specified under requirements for supervisory positions.

h. The NVS numbering plan must follow a logical plan that will lend itself to ease of use. For example, the dial code for a position could include the ATC sector number as part of that code.

i. The NVS numbering plan must ensure that each position is identified by facility, logical type and sector when the information is presented for display.

j. The NVS numbering plan must be compatible with numbering plans of switching systems that interface with the NVS. Number aliases, translation, or other methods are acceptable in meeting this requirement.

k. The NVS numbering plan must be maintained and managed by the NVSMS.

3.1.13 Radio Subsystem

The use of the term "NVS" in this section is inclusive of both the AVN and the RRN. The NVS will provide the functions required for the radio control configurations shown in FIGURE 3-2 and are summarized with the following requirements:

a. The AVN must provide voice and control signaling for interfacing with legacy Local Radios.

b. The AVN must provide Control RCE (C-RCE) emulation for interfacing with the legacy Remote RCE (R-RCE).

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c. The RRN must provide Remote RCE (R-RCE) emulation for interfacing with the legacy Control RCE (C-RCE) and legacy A/G Radios.

d. The NVS must support networked A/G communications.

e. The AVN must provide a Gateway for connecting legacy Local Radio resources to the network.

f. The AVN must provide a Gateway for connecting RCE resources to the network.

g. The RRN must provide a Gateway for connecting legacy Radios to the network.

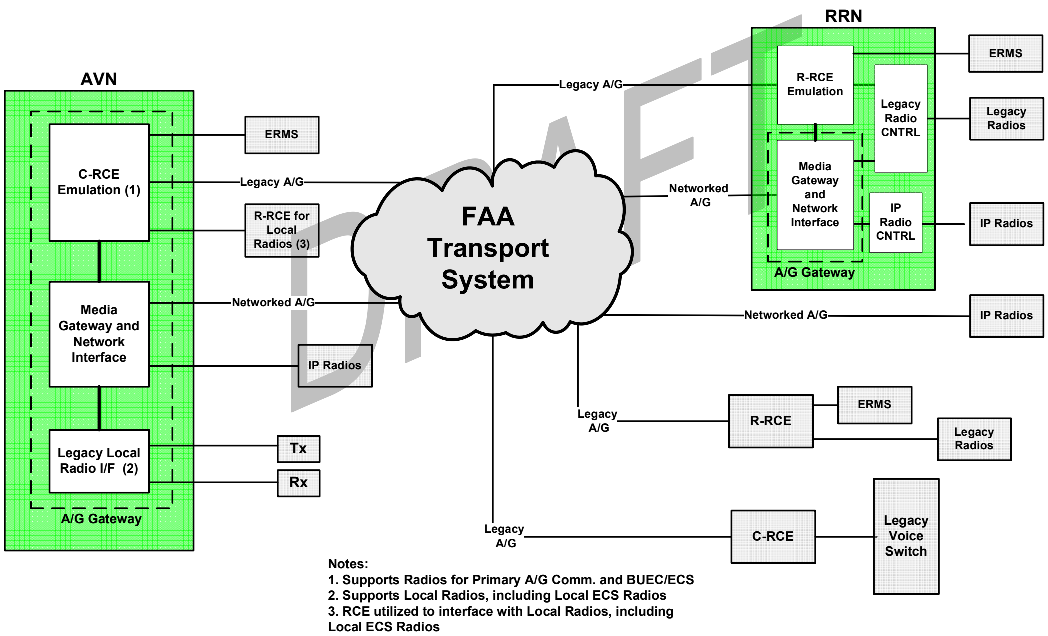

FIGURE 3-2. NVS Radio Subsystem Functions

3.1.13.1 Legacy Local Radio Functions

This subsection covers the requirements for legacy Local Radios, which are defined as analog radios that are directly connected to the AVN.

a. The AVN must interface directly to legacy local radios.

b. The AVN must provide Local Radio interfaces to transmit and receive voice and radio control signals.

c. The AVN must provide a two-wire interface that provides a TX audio signal to each local transmitter comprising the radio frequency interface (i.e., main transmitter and standby transmitter).

d. The AVN must provide a two-wire interface that accepts an RX audio signal from each local receiver comprising the radio frequency interface (i.e., main receiver and standby receiver).

e. The AVN must meet the requirements for interfacing with the Local Radios in accordance with the NVS to Radio Subsystems IRD.

3.1.13.1.1 Local Radio Control Signals

3.1.13.1.1.1 Push-to-Talk (PTT)

a. The AVN must provide PTT/PTT Release signaling to local main and standby transmitters.

b. The AVN must accept PTT/PTT Release conformation signaling from local main and standby transmitters when available.

c. The AVN must provide the option to internally generate PTT/PTT Release confirmation for local main and standby transmitters.

3.1.13.1.1.2 Main / Standby Selection

a. The AVN must provide signaling for local main or standby transmitter selection.

b. The AVN must internally generate local main or standby transmitter confirmation signals.

c. The AVN must provide signaling for local main or standby receiver selection.

d. The AVN must internally generate local main or standby receiver confirmation signals.

3.1.13.2 RCE Emulation Functions

This subsection covers the requirements of the RCE emulation functions for interfacing with the legacy RCE.

a. The NVS must provide an interface (channel) to the RCE that supports the capability to transmit and receive voice and radio control signals for up to two A/G frequencies over a single four-wire voice grade transmission path.

b. The NVS must support four RCE four-wire transmission paths.

c. The NVS must provide control over one frequency at a time or over both frequencies simultaneously for each RCE channel.

d. The NVS must provide monitoring, maintenance and configuration of the RCE over the same single four-wire voice grade interface used for voice and radio control signals.

e. The NVS must permit communication on both frequencies simultaneously with audio summing for each RCE channel.

f. The NVS must provide up to three RS-232 ports for each existing legacy RCE interface to support the transport of Environmental Remote Monitoring Subsystem (ERMS) data.

g. The NVS must meet the requirements for interfacing with the RCE in accordance with the NVS to Radio Subsystems IRD.

3.1.13.2.1 AVN C-RCE Emulation Functions

3.1.13.2.1.1 AVN Legacy Operational Configurations

The AVN will provide three operational configurations to support legacy control modes of the R-RCE. The AVN will support the following operational configurations: Separated TX and RX Configuration, Primary and Backup Configuration, and Dual Control Configuration.

a. The AVN must support the RCE option for switched backup trunks for each of the two active trunks to the two R-RCEs utilized in the "Separated TX and RX Configuration".

b. The AVN must support the RCE "Primary and Backup Configuration" in which the AVN utilizes a Primary and Backup trunk to communicate with a single R-RCE.

c. The AVN must support the RCE option to automatically or manually switch between primary and backup trunk communications to the R-RCE in the "Primary and Backup Configuration".

d. The AVN must support the RCE option to disable the backup trunk interface in the RCE "Primary and Backup Configuration".

e. The AVN must support the RCE "Dual Control Configuration" in which two separate control sites communicate with the same R-RCE.

f. The AVN must support the RCE option for a switched backup trunk for the active trunk to the R-RCE utilized in the "Dual Control Configuration"

g. The AVN must be configurable to support two active and two standby four-wire trunk interfaces to the R-RCE for legacy operational configurations.

3.1.13.2.1.1.1 AVN Split Voice and Data Option

The NVS will provide RCE interfaces that support a Split Voice/Data option for the three legacy operational configurations. Note that backup trunks to the R-RCE will only be available in the "Primary and backup Configuration".

a. The AVN must provide the RCE Split Voice/Data option in which the Telco port will contain only voice and data is routed out of an RS-232 port.

b. The AVN must provide the RCE Split Voice/Data for the three legacy operational configurations with the R-RCE.

c. The AVN must disable the modem associated with a RCE trunk that is in the Split Voice/Data configuration.

d. The AVN must enable the Telco and data port for the RCE Split Voice/Data option to switch as a pair to the backup path in the "Primary and Backup Configuration".

e. The AVN must support the RCE Split Frequency 1 / Frequency 2 option that places Frequency 1 audio to trunk 1 and Frequency 2 audio to trunk 2, when Split Voice/Data is utilized with the "Primary and Backup Configuration.

3.1.13.2.1.1.2 Recovery from Communications Path Failure

a. The AVN must detect communication path failures on primary and backup path to the R-RCE (if a backup path is available).

b. The AVN must, in the event of communication path failures to the R-RCE, automatically re-establish communications over an alternate communications path, if available, in less than or equal to 6 seconds.

c. The NVS must adopt the operator-selected state in effect prior to communication path failure to the R-RCE in less than or equal to 3 seconds following the re-establishment of communications without operator intervention.

d. The AVN must, in the case of transmission path interruption with the R-RCE exceeding three seconds, release all confirmation signals.

e. The AVN must, if no alternate transmission path has been configured to the R-RCE, prohibit either automatic or manual switching to a non-existing transmission path.

3.1.13.2.1.2 AVN Radio Control Functions

a. The AVN must encode control signals for up to two A/G frequencies associated with a RCE channel and then transmit them to the R-RCE.

b. The AVN must decode confirmation signals received from the R-RCE for up to two frequencies associated with a RCE channel and distribute them within the AVN.

c. The AVN must permit control over any of the two RCE channel frequencies one at a time.

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d. The AVN must permit control of the two RCE channel frequencies simultaneously.

3.1.13.2.1.2.1 AVN Control Signals

3.1.13.2.1.2.1.1 PTT Signaling

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a. The AVN must encode up to two independent PTT signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

b. The AVN must decode up to two independent PTT confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

c. The AVN must encode up to two independent PTT Release signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

d. The AVN must decode up to two independent PTT Release confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

3.1.13.2.1.2.1.2 Main / Standby Radio Selection

a. The AVN must encode up to two independent M/S transmitter select signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

b. The AVN must decode up to two independent M/S transmitter confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

c. The AVN must encode up to two independent M/S receiver select signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

d. The AVN must decode up to two independent M/S receiver confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

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3.1.13.2.1.2.1.3 Remote Receiver Mute

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a. The AVN must encode up to two independent receiver mute signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

b. The AVN must decode up to two independent receiver mute confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

c. The AVN must encode up to two independent receiver unmute signals for the two frequencies associated with a RCE channel and then transmit them to the R-RCE.

d. The AVN must decode up to two independent receiver unmute confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

e. The AVN must provide the option for muting the RCE channel receive path during active PTT.

3.1.13.2.1.2.1.4 Squelch Break

a. The AVN must decode up to two independent VOX/SQB confirmation signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

3.1.13.2.1.2.1.5 AGC

a. The AVN must decode up to two independent AGC signals received from the R-RCE for the two frequencies associated with a RCE channel and distribute them within the AVN.

3.1.13.2.2 RRN R-RCE Emulation Functions

3.1.13.2.2.1 RRN Legacy Operational Configurations

The RRN will support three operational configurations for the different control modes of the C-RCE. The RRN interfaces will support the following operational configurations: Separated TX and RX Configuration, Primary and Backup Configuration, and Dual Control Configuration.

a. The RRN must support the RCE option of switched backup trunks for each of the two active trunks to the C-RCE utilized in the "Separated TX and RX Configuration".

b. The RRN must support the RCE "Primary and Backup Configuration" in which the C-RCE utilizes a Primary and Backup trunk to communicate with a single RRN.

c. The RRN must support the RCE option to automatically or manually switch between primary and backup trunk communications to the C-RCE in the "Primary and Backup Configuration".

d. The RRN must support the RCE option to disable the backup trunk interface to the C-RCE in the "Primary and Backup Configuration".

e. The RRN must support the RCE "Dual Control Configuration" in which two separate control sites communicate with the same RRN.

f. The RRN must support the C-RCE option for a switched backup trunk for the active trunk to the C-RCE utilized in the "Dual Control Configuration"

g. The RRN must be configurable to support two active and two standby four-wire trunk interfaces to the C-RCE for legacy operational configurations.

3.1.13.2.2.1.1 RRN Split Voice and Data Option

The NVS RRN will provide RCE interfaces that support a Split Voice/Data option for the three legacy operational configurations. Each of the operational configurations utilizes the Telco port for voice and an RS-232 port for data. Note that backup trunks to the C-RCE will only be available in the "Primary and Backup Configuration".

a. The RRN must support the RCE Split Voice/Data option in which the Telco port will contain only voice and data is routed out of an RS-232 port.

b. The RRN must provide the RCE Split Voice/Data option for the three legacy operational configurations with the C-RCE.

c. The RRN must disable the modem associated with a RCE trunk that is in the Split Voice/Data configuration.

d. The RRN must enable the Telco and data port for the RCE Split Voice/Data option to switch as a pair to the backup path in the "Primary and Backup Configuration".

e. The RRN must support the RCE Split Frequency 1 / Frequency 2 option that places Frequency 1 audio to trunk 1 and Frequency 2 audio to trunk 2, when Split Voice/Data is utilized with the "Primary and Backup Configuration.

3.1.13.2.2.1.2 Recovery from Communications Path Failure

a. The RRN must detect communication path failures on primary and backup path to the C-RCE (if a backup path is available).

b. The RRN must, in the event of communication path failures to the C-RCE, automatically re-establish communications over an alternate communications path, if available, in less than or equal to 6 seconds.

c. The RRN must adopt the operator-selected state in effect prior to communication path failure to the C-RCE in less than or equal to 3 seconds following the re-establishment of communications without operator intervention.

d. The RRN must, in the case of transmission path interruption with the C-RCE exceeding three seconds, terminate any active PTT signal to the selected transmitter.

e. The RRN must, if no alternate transmission path has been configured to the C-RCE, prohibit either automatic or manual switching to a non-existing transmission path.

3.1.13.2.2.2 RRN Functions with Legacy Radios

a. The RRN must provide a two-wire interface that provides a TX audio signal to each transmitter comprising the radio frequency interface (i.e., main transmitter and standby transmitter).

b. The RRN must provide a two-wire interface that accepts an RX audio signal from each receiver comprising the radio frequency interface (i.e., main receiver and standby receiver).

c. The RRN must provide control signaling to the radios for up to two frequencies per RCE interface.

d. The RRN must accept confirmation signaling from the radios for up to two frequencies per RCE interface.

e. The RRN must provide +24 VDC, as directed at time of order, to the Antenna Transfer Relay (ATR) for transmitter and receiver main/standby selection.

f. The RRN must meet the requirements for interfacing with the legacy radios in accordance with the NVS to Radio Subsystems IRD.

3.1.13.2.2.3 RRN Radio Control Functions

a. The RRN must decode radio control signals received from the C-RCE for up to two related A/G frequencies and provide them to the A/G radios.

b. The RRN must encode both internally and externally generated confirmation signals for up to two frequencies associated with a RCE channel and transmit them to the C-RCE.

c. The RRN must permit individual control over any of the two RCE channel frequencies.

d. The RRN must permit simultaneous control of the two RCE channel frequencies.

3.1.13.2.2.3.1 RRN Control Signals

3.1.13.2.2.3.1.1 Push-to-Talk (PTT)

a. The RRN must decode up to two independent PTT signals received from the C-RCE for the two frequencies associated with a RCE channel and provide a keying signal to the corresponding transmitter via the RRN / Radio interface.

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b. The RRN must encode up to two independent PTT confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

c. The RRN must decode up to two independent PTT released signals received from the C-RCE for the two frequencies associated with a RCE channel and provide a PTT Release signal to the corresponding transmitter via the RRN/Radio interface.

d. The RRN must provide the option to receive or internally generate PTT/PTT Release confirmation signals for the two frequencies associated with a RCE channel.

e. The RRN must encode up to two independent PTT Release confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

3.1.13.2.2.3.1.2 Main / Standby Radio Selection

a. The RRN must decode up to two independent M/S transmitter select signals received from the C-RCE for the two frequencies associated with a RCE channel and select the main or standby transmitter via the RRN/Radio interface.

b. The RRN must, upon receipt of the main/standby transmitter select signal, provide the signal to the antenna transfer relay in accordance with the NVS to Radio Subsystems IRD.

c. The RRN must, upon receipt of the main/standby transmitter select signal, switch to the selected M/S transmitter and route the voice and control signals only to the selected transmitter.

d. The RRN must, upon switching to the selected transmitter, generate and encode up to two independent M/S transmitter confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

e. The RRN must, in the dual control configuration, transmit a M/S transmitter select confirmation signal to both control facilities regardless of which control facility issued the M/S transmitter select signal.

f. The RRN must decode up to two independent M/S receiver select signals received from the C-RCE for the two frequencies associated with a RCE channel and select the main or standby receiver via the RRN/Radio interface.

g. The RRN must, upon receipt of the main/standby receiver select signal, provide the signal to the antenna transfer relay in accordance with the NVS to Radio subsystems IRD.

h. The RRN must, upon receipt of the main/standby receiver select signal, switch to the selected M/S receiver and route the voice and control signals only to the selected receiver.

i. The RRN must, upon switching to the selected receiver, generate and encode up to two independent M/S receiver confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

j. The RRN must, in the dual control configuration, transmit a M/S receiver select confirmation signal to both control facilities regardless of which control facility issued the M/S receiver select signal.

3.1.13.2.2.3.1.3 <u>Remote Receiver Mute</u>

a. The RRN must decode up to two independent receiver mute signals received from the C-RCE for the two frequencies associated with a RCE channel and mute the receive voice signal from the selected receiver.

b. The RRN must, upon muting the selected receiver, generate and encode up to two independent mute confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

c. The RRN must decode up to two independent receiver unmute signals received from the C-RCE for the two frequencies associated with a RCE channel and unmute the receive voice signal from the selected receiver.

d. The RRN must, upon unmuting the selected receiver, generate and encode up to two independent mute confirmation signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

e. The RRN must provide the option for attenuating the audio from the receiver either 15 or 20 dB during PTT.

f. The RRN must provide a selectable delay of 0 to 1000 ms in 10 ms increments for receiver audio attenuation release after the detection of PTT release.

3.1.13.2.2.3.1.4 Squelch Break

a. The RRN must provide the option to either receive SQB signals from the receiver or internally generate VOX/SQB signals for the two frequencies associated with a RCE channel.

b. The RRN must permit VOX circuits described in section 3.2.2.4.16 to be used to internally generate A/G squelch break signaling.

c. The RRN must encode up to two independent SQB signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

3.1.13.2.2.3.1.5 AGC

a. The RRN must, upon receipt of AGC voltage from the selected receivers, encode up to two independent AGC signals for the two frequencies associated with a RCE channel and transmit them to the C-RCE.

3.1.13.3 Radio Control Access

a. The RRN must accept a minimum of two radio control signals from two separate control sites.

b. The RRN must provide radio control preemption of the lower and equal priority control sites in a multiple control configuration.

c. The RRN must provide radio control lockout signaling to all subsequent control sites attempting to access a radio while it is transmitting, in a multiple control site configuration.

d. The AVN must support both Legacy (RCE) and Networked A/G connections to the RRN.

e. The RRN must support both Legacy (RCE) and Networked A/G connections to control sites.

f. The AVN must simultaneously support both Legacy (RCE) and Networked A/G connections to the same RRN.

g. The RRN must simultaneously support both Legacy (RCE) and Networked A/G connections to control sites.

h. The RRN must provide radio control preemption of the lower and equal priority control sites for simultaneous Legacy RCE and Network connections.

i. The RRN must provide radio control lockout signaling to all subsequent control sites attempting to access a radio while it is transmitting for simultaneous Legacy RCE and Network connections.

j. The RRN must, in the event of a loss of communications with one or more control sites, maintain communications with remaining operational control sites.

3.1.13.3.1 Non-Priority Mode

a. The RRN must, when two control facilities have equal priority, provide a transmit voice path and PTT confirmation to that facility from which the PTT arrives first.

b. The RRN must, when two control facilities have equal priority, only allow one facility at a time to have control of the radios; subsequently, lockout the remaining control facilities, i.e., block the voice transmit path, PTT/PTT release, and M/S transmitter/receiver select capabilities of the remaining control facility.

c. The RRN must provide receive voice path continuously to all the control facilities, unless muted, i.e., each control facility will have the ability to mute its corresponding receive voice path.

d. The RRN must, upon release of PTT by the control facility that issued the PTT in progress, transmit a PTT release confirmation message to that control facility and terminate the lockout condition for the other control facilities.

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3.1.13.3.2 Prioritized Mode

a. The RRN must arbitrate radio access permissions to all the connected control facilities based on their priority levels.

b. The RRN must, in a multi-level priority scheme, permit the higher priority facility to override the lower priority control facility PTT with respect to communicating on the frequency to which those control facilities have access.

c. The RRN must provide a transmit voice path and PTT confirmation to the controlling facility when a controller at that facility asserts PTT.

d. The RRN must, when PTT is active at a lower priority facility and a PTT signal is received from a higher priority facility, release the lower priority facility's PTT control and lockout that facility while PTT is active from the higher priority facility.

e. The RRN must provide receive voice path continuously to all the control facilities, unless muted, i.e., each control facility will have the ability to mute its corresponding receive voice path.

f. The RRN must, upon release of PTT by the control facility that issued the PTT in progress, transmit a PTT release confirmation message to that control facility and terminate the lockout condition for the other control facilities.

3.1.13.4 NVS Networked A/G Functions

a. The NVS must support Voice over IP (VoIP) communication protocol for networked A/G interfaces in accordance with EUROCAE ED-137 specification, Part I.

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b. The NVS must meet the requirements for networked A/G interfaces in accordance with the NVS to Radio Subsystems IRD.

c. The NVS must interface with the FAA Transport System for networked A/G communications in accordance with the NVS to Government Provided Transport System IRD.

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d. The RRN must support a minimum of two simultaneous SIP Sessions at the Network interface.

e. The RRN must support a minimum of eight simultaneous SIP sessions (one per each Radio, i.e. MTX F1, MRX F1, STX F1, SRX F1, MTX F2, MRX F2, STX F2, SRX F2) at the radio interface.

f. The RRN must support a minimum of two simultaneous SIP sessions at the Maintenance interface.

3.1.14 Legacy Transition Function

a. The AVN transition function must allow the use of the legacy voice communication systems to access the G/G interfaces.

b. The AVN transition function must allow the use of the legacy voice communication systems to access the A/G interfaces.

c. The AVN transition function must allow the use of the legacy voice communication systems to access the Legal Recorder interface.

d. The AVN transition function must allow the use of the AVN to access the G/G interfaces.

e. The AVN transition function must allow the use of the AVN to access the A/G interfaces.

f. The AVN transition function must allow the use of the AVN to access the Legal Recorder interfaces.

g. The AVN transition function must allow the selection between legacy voice communication systems and AVN.

h. The AVN transition function must permit authorized personnel to transition of individual interfaces.

i. The AVN transition function must permit authorized personnel to transition groups of individual interfaces.

j. The AVN transition function must permit authorized personnel to define the groups of individual interfaces.

k. The AVN transition function must permit authorized personnel to transition all interfaces simultaneously.

l. The AVN transition function must permit authorized personnel to initiate transition from multiple locations.

m. The AVN transition function must permit authorized personnel to initiate transition from a remote location up to 1000 feet away.

n. The AVN transition between the AVN and legacy voice communication system must be completed within two (2) seconds.

o. The AVN transition function must provide a continuous visual indication of the state of each interfaces.

p. The AVN transition function must provide a notification of the transition to and from the NVS to each operational position.

q. The AVN transition function must ensure following transition to and from the existing voice switching equipment normal ATC communications capabilities are resumed without error or delay.

r. The AVN transition function must allow installation and removal without degrading the performance of the AVN or existing communications system.

3.1.15 Backup AVN Function

a. The NVS must provide the option to include an identical, physically separate Backup AVN that provides full facility connectivity to all AVN communication functions.

b. The NVS must provide the same complement of hardware for the Primary AVN and Backup AVN.

c. The NVS must provide the same complement of software for the Primary AVN and Backup AVN.

d. The NVS must, when providing a Primary AVN and Backup AVN, provide two independent AVNs that operate independently of the other AVN.

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e. The NVS must support the installation of the Primary AVN and Backup AVN at different areas of the same facility, with a distance between them not greater than 300 ft.

f. The NVS must permit the same controller interface equipment at the operator position, which includes jack Modules, TED(s), speaker(s), volume controls, and keypad device, to be used with the Primary AVN and Backup AVN.

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g. The NVS must permit authorized personnel to transition individual operator positions to/from the Backup AVN.

h. The NVS must permit authorized personnel to transition groups of operator positions to/from the Backup AVN.

i. The NVS must permit authorized personnel to define the groups of operator positions to be transitioned to/from the Backup AVN.

j. The NVS must permit authorized personnel to transition individual interfaces to/from the Backup AVN.

k. The NVS must permit authorized personnel to transition groups of interfaces to/from the Backup AVN.

l. The NVS must permit authorized personnel to define the groups of individual interfaces to be transitioned to/from the Backup AVN.

m. The NVS must permit authorized personnel to transition all operator positions and interfaces to/from the Backup AVN.

n. The NVS must provide a complete transition of any operator positions and interfaces to/from the Backup AVN in less than or equal to one second.

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o. The NVS must provide the Primary AVN and Backup AVN with the same signaling and communication connectivity from the operational position(s) to connected interfaces, but using separate paths.

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p. The NVS must provide the Backup AVN with separate paths for voice, control, and power from the Primary AVN.

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q. The NVS must provide the Backup AVN with an independent, physically separate Local NVSMS from the Primary AVN.

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r. The NVS must provide the Backup AVN with independent, physically separate configuration Data Bases from the Primary AVN.

s. The NVS must be designed such that the failures or effects of failures in either the Primary AVN or Backup AVN cannot propagate to the other AVN.

t. The NVS must provide the Backup AVN with separate maintenance position(s) from the Primary AVN.

u. The NVS must allow the Primary AVN and Backup AVN to run self-diagnostics and report status independently.

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v. The NVS must, in the event of transition function failure between the Primary AVN and Backup AVN, maintain the signaling and communication connectivity in effect prior to the failure.

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3.1.16 Training Mode Function

The training mode is intended to allow an operator position to be used on a temporary basis to provide training for air traffic controllers. It needs to be possible to isolate the positions being used for training from the other operator positions not being used for training to prevent a trainee from interfering with the separation services provided from the non-training positions. Thus, the training positions cannot be capable of accessing any A/G or G/G communications resource used to control live air traffic.

The training positions also need to be prevented from communicating with non-training positions. Since the training positions are supposed to simulate the actual conditions that the air traffic controllers will encounter when controlling real air traffic, the labels for the simulated A/G and G/G resources, including the labels on the training position TEDs for the other training positions, should be configurable to match the labels for the actual communications resources and positions used to control live air traffic.

It is anticipated that an "area" (or multiple areas) will be configured for the training positions. Only those users with an authorized role can reconfigure a position into training mode to prevent a user with a training role from accidentally reconfiguring non-training positions or non-training (i.e., "live") communications resources.

a. The AVN must permit authorized access levels to classmark any operator position for use in training mode (hereafter referred to as a training position throughout section 3.1.16).

b. The AVN must permit authorized access levels to classmark from none to all operator positions for use as training positions.

c. The AVN must permit all training positions to operate concurrently with all positions not in the training mode (hereafter referred to as non-training positions throughout section 3.1.16)

d. The NVS must preclude voice communications between training positions and non-training positions.

e. The NVS must preclude use of any A/G and G/G communications resources by training positions, except for simulated A/G and G/G communications resources.

f. The AVN must provide continuous visual indication at the operator position, when the position is operating in the training mode.

3.1.16.1 Simulation of A/G and G/G Communications

Simulated A/G and G/G resources are intended to operate as if two physical interfaces were present and connected back-to-back (i.e., transmit path of one to receive path of the other and vice versa). One physical interface would be assigned to the trainee position and the other to the instructor position, allowing them to communicate as if in separate facilities in the case of G/G communications, or as if the instructor was a pilot responding to direction from the trainee. The simulated resources should operate in a manner consistent with actual A/G and G/G circuits (i.e., provide the same alerting, visual indications, and functional operation).

a. The AVN must permit authorized access levels to define simulated communications resources for use only by training positions.

b. The AVN must permit authorized access levels to define simulated communications resources having labels/identifiers that duplicate A/G and G/G communications resources used by non-training positions.

c. The AVN must permit authorized access levels to define simulated G/G communications resources having labels/identifiers that duplicate non-training position labels/identifiers.

d. The AVN must permit authorized access levels to define a trainee endpoint and an instructor endpoint for each simulated communications resource.

e. The AVN must permit communication between the trainee endpoint and the instructor endpoint of any simulated communications resources.

f. The AVN must ensure that the trainee and instructor endpoints for any simulated communications resource exhibit identical operation, with respect to the type of interface they are simulating.

g. The AVN must ensure that the trainee and instructor endpoints for any simulated communications resource provide alerting and indications at the training positions appropriate to the type of communications resource they are simulating.

3.1.16.1.1 Simulated A/G Communications Resources

a. The AVN must permit authorized access levels to create simulated A/G communications resources.

b. The AVN must permit authorized access levels to edit simulated A/G communications resources.

c. The AVN must permit authorized access levels to delete simulated A/G communications resources.

d. The AVN must permit at least 256 simulated A/G communications resources.

e. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as a main-only frequency.

f. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as a main-standby frequency.

g. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as an emergency frequency.

h. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as a BUEC/ECS frequency.

i. The AVN must permit authorized access levels to create simulated multiple site groups in accordance with 3.1.2.1.3.8.

j. The AVN must permit at least 128 simulated multiple site groups.

k. The AVN must permit authorized access levels to edit simulated multiple site groups in accordance with 3.1.2.1.3.8.

l. The AVN must permit authorized access levels to delete simulated multiple site groups in accordance with 3.1.2.1.3.8.

m. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as part of a simulated multiple site group.

n. The AVN must permit authorized access levels to classmark a simulated A/G communications resource to operate as a paired frequency.

3.1.16.1.2 Simulated G/G Communications Resources

a. The AVN must permit authorized access levels to create simulated G/G communications resources .

b. The AVN must permit authorized access levels to edit simulated G/G communications resources.

c. The AVN must permit authorized access levels to delete simulated G/G communications resources.

d. The AVN must permit at least 256 simulated G/G resources.

e. The AVN must permit authorized access levels to classmark any simulated G/G communications resource to operate as a non-selective chime call.

f. The AVN must permit authorized access levels to classmark any simulated G/G communications resource to operate as a selective chime call.

g. The AVN must permit authorized access levels to classmark any simulated G/G communications resource to operate as a voice call.

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h. The AVN must permit authorized access levels to classmark any simulated G/G communications resource to operate as an override call.

3.1.16.2 Training Position Functionality and Performance

a. The AVN must provide training positions that permit access to all operator position functions defined in 3.1.2, using only simulated A/G and G/G communications resources.

b. The AVN must provide training positions that permit IC communications with any other training position.

c. The AVN must provide training positions meeting the performance requirements of 3.2, using only simulated A/G and G/G communications resources.

3.1.16.3 Isolation of Training Positions and Simulated Communications

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a. The NVS must preclude voice communications between training positions and non-training positions.

b. The NVS must preclude use of any A/G and G/G communications resources by training positions, except for simulated A/G and G/G communications resources.

3.1.16.4 Reconfiguration

A position should be classmarkable as available for use in training mode. To be used for training, a reconfiguration of the position from non-training to training mode must occur. This prevents some positions from ever being used in the training role as an added measure of security against accidental reconfiguration. Positions can only be reconfigured into the training mode by a user logged in with a "live" operation role. This is intended to prevent an accidental assignment of a live position into training mode by a user in the training role. A user in the "live" operation role will also be required to change a position from the training mode back to the non-training (i.e., live operation) mode.

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a. The AVN must provide training positions that meet the reconfiguration requirements of 3.1.6, using only simulated A/G and G/G communications resources .

b. The AVN must permit authorized access levels to assign the trainee endpoint of each simulated communications endpoint to any training position through reconfiguration.

c. The AVN must permit authorized access levels to assign the instructor endpoint of each simulated communications endpoint to any training position through reconfiguration.

d. The AVN must preclude reconfiguration of any non-training position by access levels authorized to reconfigure training positions.

e. The AVN must permit authorized access levels to reconfigure any non-training position as a training position.

f. The AVN must permit authorized access levels to reconfigure any training position as a non-training position.

g. The AVN must permit only access levels authorized to reconfigure non-training positions to reconfigure non-training positions as training positions.

h. The AVN must permit only access levels authorized to reconfigure non-training positions to reconfigure training positions as non-training positions.

i. The AVN must permit authorized access levels to assign dial codes for training positions and simulated communications resources that are compatible with individual facility dial codes/numbering plans.

j. The AVN must permit authorized access levels to change training dial codes associated with training positions and simulated communications resources through reconfiguration.

3.1.16.5 Legal Recording

a. The AVN must provide training positions that meet the legal recording requirements for position recording of 3.1.9.3, using only simulated A/G and G/G communications resources.

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3.1.17 Software/Firmware Maintenance

a. The NVS must support Software/Firmware download(s) to any NVS node component.

b. The NVS must ensure that software/firmware download can be performed without any impact to ATC operations.

c. The NVS must ensure that components requiring software/firmware upgrades contains sufficient memory to store a minimum of two software/firmware versions.

d. The NVS must, in the event of software/firmware download failure, provide an indication of the failure.

e. The NVS must, in the event of software/firmware download failure, ensure the software/firmware version that was in effect prior to the download remains in effect.

f. The NVS must permit authorized personnel to select which version of software/firmware is operational at any NVS node component.

g. The NVS must be permit authorized personnel to perform a query to receive all software/firmware version of any NVS node component.

h. The NVS must permit authorized personnel to perform a query to receive all software/firmware versions with the file integrity information of any NVS node component.

i. The NVS must permit authorized personnel to print the results of any software/firmware version query.

j. The NVS must, upon the installation of new NVS node components, ensure that the current version of the software/firmware on the component is immediately reported to the local NVSMS.

k. The NVS must permit authorized personnel of export the software/firmware to an external device.

3.2 Core Performance Requirements

3.2.1 Call Blocking Probability

a. The NVS must ensure that no incoming A/G call is blocked for any reason other than the unavailability or prior occupancy of an external (non-NVS) resource.

b. The NVS must ensure that no outgoing A/G call is blocked for any reason other than the unavailability or prior occupancy of an external (non-NVS) resource.

c. The NVS must ensure that incoming A/G calls meet or exceed the allowable delay limits stated in 3.2.2 for all traffic conditions.

d. The NVS must ensure that outgoing A/G calls meet or exceed the allowable delay limits stated in 3.2.2 for all traffic conditions.

e. The NVS must ensure that no incoming G/G call is blocked for any reason other than the unavailability or prior occupancy of an external (non-NVS) resource.

f. The NVS must ensure that no outgoing G/G call is blocked for any reason other than the unavailability or prior occupancy of an external (non-NVS) resource.

g. The NVS must ensure that incoming G/G calls meet or exceed the allowable delay limits stated in 3.2.2 for all traffic conditions.

h. The NVS must ensure that outgoing G/G calls meet or exceed the allowable delay limits stated in 3.2.2 for all traffic conditions.

3.2.2 Performance Requirements

3.2.2.1 Throughput Timing Requirements

a. The NVS must meet the performance requirements specified in section 3.2.2.1 for the operational environments shown in TABLE 3-5.

b. The NVS must meet the throughput timing requirements specified in TABLE 3-8 and the associated paragraphs in Section 3.2.2.1, subject to the traffic loads, blocking probabilities, and call distribution during the Peak Busy Hour (PBH) and Peak Busy Minute (PBM) conditions shown in TABLE 3-6 and TABLE 3-7.

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c. The NVS must meet the response times specified in TABLE 3-8 based on each of the configuration load dispersals defined in TABLE 3-7.

d. The NVS must consider all specified response times in Table 3-8 to be applicable as “end to end" measurement points with reference to the NVS external equipment interfaces.

e. The NVS must exclude the TED detection time for transactions originating at a position as part of the total response time for the event.

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f. The AVN must have a TED detection time of less than or equal to 10 ms.

g. The NVS must exclude the display device response times for transactions terminating at a position as part of the total response time for the event.

h. The AVN must have a display device response time of less than or equal to 25 ms.

i. The NVS must exclude the delays and wait periods associated with operator inputs (e.g., digit dialing) as part of the total response time for the event.

j. The AVN must, for transactions originating at a legacy trunk interface, base the beginning of the throughput timing interval as the receipt by the AVN of the complete information needed to service the transaction.

k. The NVS must, for transactions originating at a legacy radio interface, base the beginning of the throughput timing interval as the receipt by the NVS of the complete information needed to service the transaction.

l. The NVS must, for transactions originating at the network interface, base the beginning of the throughput timing interval as the receipt by the NVS of the complete information needed to service the transaction.

m. The AVN must, for transactions terminating at a legacy trunk interface, base the end of the throughput timing interval as the latest event having timing totally dependent on the AVN performance.

n. The NVS must, for transactions terminating at a legacy radio interface, base the end of the throughput timing interval as the latest event having timing totally dependent on NVS performance.

o. The NVS must, for transactions terminating at the network interface, base the end of the throughput timing interval as the latest event having timing totally dependent on NVS performance.

TABLE 3-5. AVN Operational Environments

Sizing Parameter	Initial No. Required	
	Minimum[1]	Maximum
Positions	4	800
Inter- facility Interfaces[2]	4	800
Radio Interfaces[3]	4	800
AVN Gateway Interfaces[4]	8	200

Notes:
1. The data under "Minimum" represents a generic Minimum System, but does not preclude zero for any item. The contract schedule defines exact sizing for each site.
2. Inter-facility Interfaces are defined as any combination of Legacy Trunks and VoIP circuits.
3. Radio Interfaces are defined as any combination of Legacy and VoIP paths to the radios.
4. AVN Gateway Interfaces provide VoIP access to an AVN's Legacy Local Radios, RCE Radios, and Local Legacy Trunks.

TABLE 3-6. Grades of Service and Average Traffic Loads During Peak Busy Hour (PBH) and Peak Busy Minute (PBM)

Function	Grade of Service	Holding Time, s[1]	Erlangs (PBH)	Calls/ Hour During PBH [2]	Erlangs (PBM)	Calls / Minute During PBM [2]
A/G PTT [3]	Non-blocking	4	0.333	300	0.4333	6.5
SQB [4]	Non-blocking	4	0.333	300	0.4333	6.5
Main/Standby TX/RX [3]	Non-blocking			4		0.2
A/G PTT [5] (AVN Gateway for Legacy Local Radios)	Non-blocking	4	0.333	300	0.4333	6.5
SQB [5] (AVN Gateway for Legacy Local Radios)	Non-blocking	4	0.333	300	0.4333	6.5

Function	Grade of Service	Holding Time, s[1]	Erlangs (PBH)	Calls/ Hour During PBH [2]	Erlangs (PBM)	Calls / Minute During PBM [2]
A/G PTT [5] (AVN Gateway for RCE Radios)	Non-blocking	4	0.333	300	0.4333	6.5
SQB [5] (AVN Gateway for RCE Radios)	Non-blocking	4	0.333	300	0.4333	6.5
IC calls within the AVN [3]	Non-blocking	20	0.1	18	0.33	1
Inter-facility calls, Local Initiation [3]	Non-blocking	20	0.1	18	0.33	1
Inter-facility calls, Remote Initiation [3]	Non-blocking	20	0.1	18	0.33	1
Inter-facility calls [5,6], (Networked AVN to AVN Gateway)	Non-blocking	20	0.1	18	.33	1
Inter-facility calls [5,6], (Legacy Trunks to AVN Gateway)	Non-blocking	20	0.1	18	.33	1

Notes:
1. Holding times have an exponential distribution.
2. Call arrival rates have a Poisson distribution.
3. Generated per position. A/G and G/G operation occurs simultaneously at a position. Peak Busy traffic loads assume dual TED or Split position operation.
4. Generated at Radio Interface and sent to the position
5. Generated externally, utilizing AVN Gateway
6. Inter-facility calls through the AVN Gateway is not additional traffic load at an AVN position. It only provides a means to access legacy trunks from another AVN.

TABLE 3-7. PBH and PBM Call Distribution

Function	Resource	**Configuration Load Dispersals** (Percentage of Table 3-6 Load Specifications)

		Load A[1] (%)	Load B[2] (%)	Load C[3] (%)	Load D[4] (%)	Load E[5] (%)
A/G PTT [6]						
	Position to AVN Legacy Local Radio Interface	5	10	0	5	5
	Position to RRN/RRCE Legacy Radio Interface, RCE Emulation	85	35	10	10	25
	Position to AVN VoIP Radio Interface	10	10	10	5	5
	Position to RRN Legacy Radio Interface, VoIP	0	35	60	60	25
	Position to RRN IP Radio Interface, VoIP	0	10	20	20	40
SQB						
	AVN Legacy Local Radio Interface to Position	5	10	0	5	5
	RRN/RRCE Legacy Radio Interface to Position, RCE Emulation	85	35	10	10	25
	AVN VoIP Radio Interface to Position	10	10	10	5	5
	RRN Legacy Radio Interface to Position, VoIP	0	35	60	60	25
	RRN IP Radio Interface to Position, VoIP	0	10	20	20	40
M/S TX/RX						
	Position to AVN Legacy Local Radio Interface	5	10	0	5	5
	Position to RRN/RRCE Legacy Radio Interface, RCE Emulation	85	35	10	10	25
	Position to AVN VoIP Radio Interface	10	10	10	5	5
	Position to RRN Legacy Radio Interface, VoIP	0	35	60	60	25
	Position to RRN IP Radio Interface, VoIP	0	10	20	20	40

Function	Resource	Configuration Load Dispersals (Percentage of Table 3-6 Load Specifications)				
		Load A[1] (%)	Load B[2] (%)	Load C[3] (%)	Load D[4] (%)	Load E[5] (%)
A/G PTT (External)	AVN Gateway for Legacy Local Radios (VoIP to Legacy Radio)	0	25	50	50	50
SQB (External)	AVN Gateway for Legacy Local Radios (Legacy Radio to VoIP)	0	25	50	50	50
A/G PTT (External)	AVN Gateway for RCE Radios (VoIP to RCE)	0	25	50	50	50
SQB (External)	AVN Gateway for RCE Radios (RCE to VoIP)	0	25	50	50	50
IC [7]	Position to Position, same facility	100	100	100	100	100
Inter-facility calls [8] **(Local Initiation)**	Legacy Trunk Interfaces [9]	100	50	10	50	60
	VoIP Circuit Interfaces	0	50	90	50	40
Inter-facility calls [8] **(Remote Initiation)**	Legacy Trunk Interfaces [9]	100	50	10	50	60
	VoIP Circuit Interfaces	0	50	90	50	40
Inter-facility calls (VoIP to Trunk)	AVN Gateway for Legacy Trunks	100	50	10	50	60
Inter-facility calls (Trunk to VoIP)	AVN Gateway for Legacy Trunks	100	50	10	50	60

Notes:
1. Intended to represent load distribution for Initial NVS Deployment.
2. Intended to represent load distribution for Median NVS Deployment.
3. Intended to represent load distribution for Full NVS Deployment.
4. Intended to represent load distribution for Load Sharing, Between Facilities.
5. Intended to represent load distribution for BCP.
6. Assume 20% of A/G frequencies are cross coupled and are dispersed throughout the distribution shown.
7. Loading to include 85% Override and 15% Non-Override calls.
8. Loading to include 75% Override and 25% Non-Override calls dispersed through distribution shown.
9. Legacy Trunk Interfaces includes PABX Tielines.

TABLE 3-8. Setup/Teardown Throughput Timing Requirements During PBH and PBM

Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
A/G Functions within the AVN (section 3.2.2.1.1.1)			
System-Generated A/G PTT Transmit (radio cross coupling)	40		45
Frequency Select	125	175	
Frequency Deselect	125	175	
Frequency cross couple Selection	125	175	
Frequency cross couple Deselection	125	175	
Frequency Preemption Activation	25		30
PTT Lockout (Preemption) Busy Tone	60	85	
Frequency Site Selection	125	175	
Frequency Site Confirmation	125	175	
Local Receive Mute	50	75	
Local Receive Mute Indicator	75	100	
Local Receive Unmute	50	75	
Local Receive Unmute Indicator	75	100	
Position to/from AVN Legacy Local Radio Interface[3,5] (section 3.2.2.1.1.2)			
PTT	25		30
PTT Indicator, Externally Provided	50	75	
PTT Indicator, Internally Generated	40	50	
PTT Release	25		30
PTT Release Indicator Externally Provided	50	75	
PTT Release Indicator, Internally Generated	40	50	
M/S TX/RX Transfer	75	100	
M/S TX/RX Transfer Indicator, Internally Generated	75	100	
Radio Squelch Break Audio Path Setup	5		10
Radio Squelch Break Indicator	50	75	
Voice Delay, position-to-radio interface	40	50	
Voice Delay, radio interface-to-position	40	50	
Position to/from RRN/R-RCE Legacy Radio Interface, RCE Emulation[3,5] (section 3.2.2.1.1.3 and 3.2.2.1.1.4)			
PTT	85		110
PTT Indicator	85	110	
PTT Release	85		110
PTT Release Indicator	85	110	

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Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
M/S TX/RX Transfer	85	110	
M/S TX/RX Transfer Indicator	100	125	
Remote Receiver Mute	125	150	
Remote Receiver Mute Indicator	150	175	
Remote Receiver Unmute	125	150	
Remote Receiver Unmute Indicator	150	175	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break Indicator	125	150	
Voice Delay, position-to-radio interface	75	85	
Voice Delay, radio interface-to-position	75	85	
Position to/from AVN VoIP Radio Interface[3,4] (section 3.2.2.1.1.5)			
PTT	25		30
PTT Indicator	40	50	
PTT Release	25		30
PTT Release Indicator	40	50	
M/S TX/RX Transfer	75	100	
M/S TX/RX Transfer Indicator	75	100	
Remote Receiver Mute	40	60	
Remote Receiver Mute Indicator	50	75	
Remote Receiver Unmute	40	60	
Remote Receiver Unmute Indicator	50	75	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break Indication	50	75	
Voice Delay, position-to-radio interface	40	50	
Voice Delay, radio interface-to-position	40	50	
Position to/from RRN Legacy Radio Interface, VoIP[3,5] (section 3.2.2.1.1.6)			
PTT	45		55
PTT Indicator	75	95	
PTT Release	45		55
PTT Release Indicator	75	95	
M/S TX/RX Transfer	95	145	
M/S TX/RX Transfer Indicator	95	145	
Remote Receiver Mute	75	115	
Remote Receiver Mute Indicator	95	145	

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Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
Remote Receiver Unmute	75	115	
Remote Receiver Unmute Indicator	95	145	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break Indicator	95	145	
Voice Delay, position-to-radio interface	40	50	
Voice Delay, radio interface-to-position	40	50	
Position to/from RRN IP Radio Interface, VoIP[3,5] (section 3.2.2.1.1.7)			
PTT	45		55
PTT Indicator	75	95	
PTT Release	45		55
PTT Release Indicator	75	95	
M/S TX/RX Transfer	95	145	
M/S TX/RX Transfer Indicator	95	145	
Remote Receiver Mute	75	115	
Remote Receiver Mute Indicator	95	145	
Remote Receiver Unmute	75	115	
Remote Receiver Unmute Indicator	95	145	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break Indicator	95	145	
Voice Delay, position-to-radio interface	40	50	
Voice Delay, radio interface-to-position	40	50	
VoIP to/from AVN Legacy Local Radio Interface, via AVN Gateway[3,5] (section 3.2.2.1.1.8)			
PTT	25		30
PTT Confirmation, Externally Provided	50	75	
PTT Confirmation, Internally Generated	40	50	
PTT Release	25		30
PTT Release Confirmation, Externally Provided	50	75	
PTT Release Confirmation, Internally Generated	40	50	
M/S TX/RX Transfer	75	100	
M/S TX/RX Transfer Confirmation, Internally Generated	40	50	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break	50	75	
Voice Delay, network interface-to-radio interface	40	50	
Voice Delay, radio interface-to-network interface	40	50	

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Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
Position to/from RRN Legacy Radio Interface, via AVN Gateway & RCE Emulation[3,5] (section 3.2.2.1.1.9)			
PTT	100		130
PTT Indicator	125	160	
PTT Release	100		130
PTT Release Indicator	125	160	
M/S TX/RX Transfer	135	185	
M/S TX/RX Transfer Indicator	150	200	
Remote Receiver Mute	165	210	
Remote Receiver Mute Indicator	200	250	
Remote Receiver Unmute	165	210	
Remote Receiver Unmute Indicator	200	250	
Radio Squelch Break Audio Path setup	5		10
Radio Squelch Break Indicator	175	225	
Voice Delay, position-to-radio interface	90	110	
Voice Delay, radio interface-to-position	90	110	
G/G Functions within the AVN[6] (section 3.2.2.1.2.1)			
PTT	10	15	
PTT Release	10	15	
Conference Call Select	125	175	
Conference Call Indicator	125	175	
Conference Call Deselect	125	175	
Call Hold	100	150	
Call Resume	100	150	
Call Forward Select	125	175	
Call Forward Select Confirmation	125	175	
Call Forward Deselect	125	175	
Unacceptable Call Forward Alert	125	175	
Call Transfer Selection	100	150	
Unaccepted Call Transfer Alert	100	150	
Call Retrieval from Common Answer Queue	100	150	
Confirm Calls in Common Answer Queue	100	150	
IA Keypad Selection	100	150	
Position to/from Position, same facility[3,5] (section 3.2.2.1.2.2)			

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Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
IC Call Placement	100	150	
IC Call Operation Indicator	120	150	
IC Call Ringback Tone	100	150	
IC Busy Tone	100	150	
IC Call Acceptance	100	150	
IC Circuit Release	100	150	
IC OVR Call Placement/Acceptance	100	150	
Voice Delay, position-to-position	40	50	
Position to/from AVN Legacy Trunk Interface[3,5] (section 3.2.2.1.2.3)			
Position-to-Trunk Interphone Call Placement	100	150	
Trunk-to-Position Interphone Call Placement	100	150	
Position-to-Trunk Interphone Call Acceptance	100	150	
Trunk-to-Position Interphone Call Acceptance	100	150	
Interphone Circuit Release	100	150	
Interphone Circuit Release (Releasing position external to AVN)	100	150	
Dial Tone for Indirect Access	100	150	
Position-to-Trunk Interphone OVR Call Placement Response Time	100	150	
Trunk-to-Position Interphone OVR Call Acceptance Response Time	100	150	
Voice Delay, position-to-trunk	40	50	
Voice Delay, trunk-to-position	40	50	
Position to/from AVN VoIP Interface[3,4] (section 3.2.2.1.2.4)			
Call Placement	100	150	
Call Acceptance	100	150	
Voice Delay, position-to-network	40	50	
Voice Delay, network-to-position	40	50	
Position to/from AVN Legacy Trunk Interface Via AVN Gateway[3,5] (section 3.2.2.1.2.5)			
Position-to-Trunk Interphone Call Placement	200	300	
Trunk-to-Position Interphone Call Placement	200	300	
Position-to-Trunk Interphone Call Acceptance	200	300	

Type of Event	Max. Response Time, msec[1,2] Percent of Event Completions		
	95%	99.9%	99.99%
Trunk-to-Position Interphone Call Acceptance	200	300	
Interphone Circuit Release	200	300	
Interphone Circuit Release (Releasing position external to AVN)	200	300	
Dial Tone for Indirect Access	200	300	
Position-to-Trunk Interphone OVR Call Placement Response Time	200	300	
Trunk-to-Position Interphone OVR Call Acceptance Response Time	200	300	
Voice Delay, position-to-trunk	55	75	
Voice Delay, trunk-to-position	55	75	
Position Functions within the AVN (section 3.2.2.1.3)			
Position Voice Monitor Selection	100	150	
Voice Monitor Selection Confirmation	100	150	
Position Split Functionality Mode Enable	100	150	
Position Split Functionality Mode Disable	100	150	

Notes:
1. Where applicable, response times exclude TED detection time and display device response times.
2. All timing parameters exclude network delays.
3. Response times are based on a packetization interval of 10ms at the external interface.
4. When the packetization interval is increased to 20ms, the response times allow for a maximum increase of 10ms for each parameter. When the packetization interval is increased to 30ms, the response times allow for a maximum increase of 20ms for each parameter.
5. When the packetization interval is increased to 20ms, the response times allow for a maximum increase of 30ms for each parameter. When the packetization interval is increased to 30ms, the response times allow for a maximum increase of 60ms for each parameter.
6. Voice delays for specific G/G paths are applicable for point to point calls and conference situations.

3.2.2.1.1 A/G Performance

The following A/G performance requirements define the measurement of the parameters specified in TABLE 3-8, subject to the traffic loads, blocking probabilities, and call distribution during the Peak Busy Hour (PBH) and Peak Busy Minute (PBM) conditions shown in TABLE 3-6 and TABLE 3-7.

The use of the term “NVS” in this section will be inclusive of both the AVN and the RRN. The dotted lines shown in FIGURE 3-3 illustrate the various paths of the A/G events listed in TABLE 3-8.

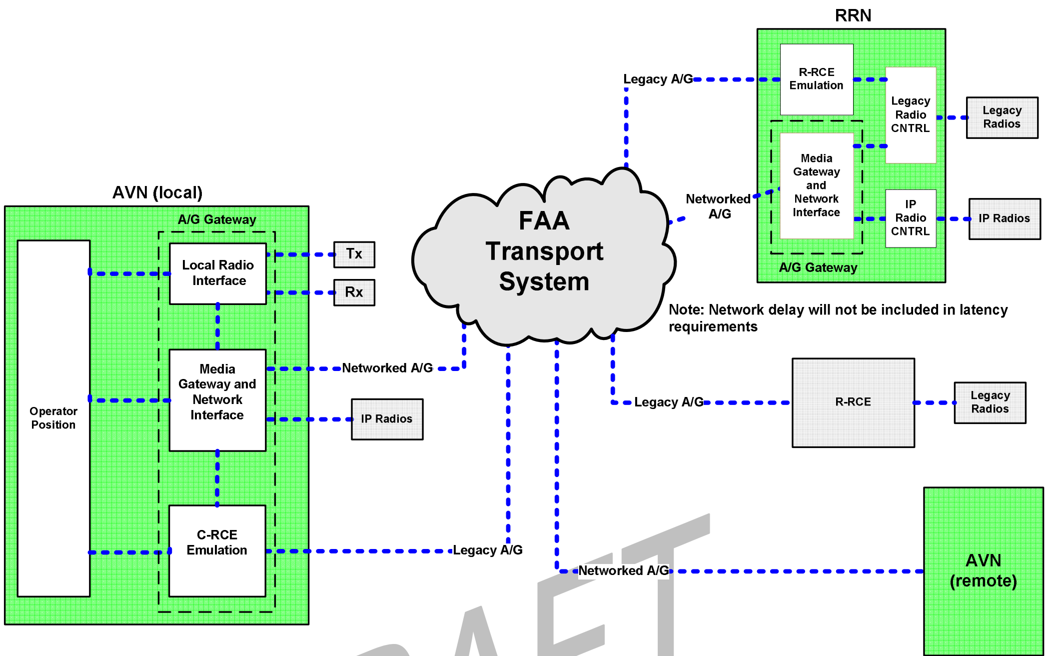

FIGURE 3-3. A/G Performance Paths

3.2.2.1.1.1 A/G Functions within the AVN

3.2.2.1.1.1.1 System-Generated PTT transmit

a. The AVN must meet the specified response time for System-Generated A/G PTT Transmit, when measured from the instant that a request for a feature that requires a system-generated A/G PTT is present in the AVN, to the instant that an A/G PTT signal is present at the AVN A/G interface.

3.2.2.1.1.1.2 Frequency Selection/Deselection

a. The AVN must meet the specified response time for Frequency Selection, when measured from the instant a request for a frequency selection is initiated at the position, to the instant that the selected assigned frequency is enabled at the position.

b. The AVN must meet the specified response time for Frequency Deselection, when measured from the instant a request is initiated at the position, to the instant that the selected assigned frequency is disabled at the position.

3.2.2.1.1.1.3 Frequency Cross Coupling Selection/Deselection

a. The AVN must meet the specified response time for Frequency Cross Coupling Selection, when measured from the instant a request for enabling cross-coupling of the designated frequencies is made at the position, to the instant the selected frequencies are coupled.

b. The AVN must meet the specified response time for Frequency Cross Coupling Deselection, when measured from the instant a request for disabling cross-coupling of the designated frequencies is made at the position, to the instant the selected frequencies are decoupled.

3.2.2.1.1.1.4 Frequency Preemption/PTT Lockout

a. The AVN must meet the specified time for Frequency Preemption Activation, when measured from the instant the PTT switch is activated by the operator, to the instant that PTT causes termination of any transmission in progress on that frequency at any other ATC position.

b. The AVN must meet the specified response time for PTT Lockout (Preemption) Busy Tone, when measured from the instant that a valid operator PTT action (from the preempting position) is initiated at the position, to the instant that the lockout busy tone is available at the preempted position’s headset or loudspeaker.

3.2.2.1.1.1.5 Frequency Site Selection and Confirmation

a. The AVN must meet the specified response time for Frequency Site Selection, when measured from the instant a request for a change in frequency site selection is initiated at the position, to the instant the selected site is enabled.

b. The AVN must, for multiple site frequencies, meet the specified response time for frequency site selection, which includes the deselection of any previously selected frequency site.

c. The AVN must meet the specified response time for Frequency Site Confirmation, when measured from the instant a frequency site selection is enabled, to the instant an AVN generated confirmation of site transfer is received at the requesting operational positions.

3.2.2.1.1.1.6 Local Receiver Mute/Unmute and Indicator

a. The AVN must meet the specified response time for Local Receive Mute, when measured from the instant a request is initiated at the position, to the instant that the selected frequency audio voice signal is muted at the position headset or loudspeaker.

b. The AVN must meet the specified time for Local Receive Mute Indicator, when measured from the instant a request is initiated at the position, to the instant that a Local Receive Mute indicator response is activated at the position that generated the local receiver mute signal.

c. The AVN must meet the specified response time for Local Receive Unmute, when measured from the instant a request is initiated at the position, to the instant that the selected frequency audio voice signal is received at the position headset or loudspeaker.

d. The AVN must measure the response time for Local Receive Unmute Indicator, when measured from the instant a request is initiated at the position, to the instant that a Local Receive Unute indicator response is activated at the position that generated the local receiver mute signal.

3.2.2.1.1.2 Position to/from AVN Legacy Local Radio Interface

3.2.2.1.1.2.1 PTT/PTT Release and Indicator

a. The AVN must, for legacy local radios, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT signal is present at the output of the AVN radio interface.

b. The AVN must, for legacy local radios, meet the specified response time for an externally provided PTT Indicator, when measured from the instant that a PTT confirmation signal is present at the AVN radio interface to the instant that the PTT indicator response is activated at the calling position.

c. The AVN must, for legacy local radios that do not provide PTT confirmation, meet the specified response time for an internally generated PTT confirmation, when measured from the instant the PTT confirmation is generated by the AVN Radio Interface Equipment, to the instant that the PTT indicator response is activated at the calling position.

d. The AVN must, for legacy local radios, meet the specified response time for PTT Release, when measured from the instant that the PTT switch breaks contact, without waiting for debounce at the position, to the instant that the PTT signal is absent at the output of the AVN radio interface.

e. The AVN must, for legacy local radios, meet the specified response time for an externally provided PTT Release Indicator, when measured from the instant that a PTT Release confirmation signal is present at the AVN radio interface to the instant that the PTT indicator response is deactivated at the calling position.

f. The AVN must, for legacy local radios that do not provide PTT confirmation, meet the specified response time for an internally generated PTT Release confirmation, when measured from the instant the PTT Release confirmation is generated by the AVN Radio Interface Equipment, to the instant that the indicator response is deactivated at the calling position.

3.2.2.1.1.2.2 M/S TX/RX Transfer and Indicator

a. The AVN must, for legacy local radios, meet the specified response time for M/S TX/RX Transfer from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer signal is present at the AVN radio interface.

b. The AVN must, for legacy local radios, meet the specified response time for an internally generated M/S TX/RX Transfer confirmation, when measured from the instant the M/S TX/RX Transfer Confirmation is generated by the AVN Radio Interface Equipment, to the instant that the indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.2.3 Radio Squelch Break and Indicator

a. The AVN must, for legacy local radios, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break signal is received at the radio interface of the AVN, to the instant the audio path is set up from the radio interface to the position(s) headset or loudspeaker.

b. The AVN must, for legacy local radio interfaces that do not provide a squelch break signal, interpret the reception of voice signals from the radio interface as a squelch break and set up the audio path between the radio interface and the position(s).

c. The AVN must, for legacy local radios, meet the specified response time for Radio Squelch Break Indicator from the instant the squelch break signal is received or generated at the AVN radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.2.4 Voice Delay

a. The AVN must, for legacy local radios, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice is received at the AVN radio interface.

b. The AVN must, for legacy local radios, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant voice is present at the radio interface to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.3 Position to/from RRN Legacy Radio Interface, RCE Emulation

3.2.2.1.1.3.1 PTT/PTT Release and Indicator

a. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation signal is present at the legacy radio interface with the RRN, to the instant that indicator response is activated at the calling position.

c. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for PTT Release, when measured from the instant that the PTT signal is removed after the PTT switch breaks contact without waiting for debounce at the position, to the instant that the PTT signal is absent from the output of the RRN legacy radio interface.

d. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for PTT Release Indicator, when measured from the instant that a PTT confirmation signal is no longer present at the legacy radio interface with the RRN, to the instant that indicator response is deactivated at the calling position.

3.2.2.1.1.3.2 M/S TX/RX Transfer and Indicator

a. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for M/S TX/RX Confirmation, when measured from the instant that the M/S TX/RX transfer confirmation signal is present at the legacy radio interface with the RRN, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.3.3 Remote Receiver Mute/Unmute and Indicator

a. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Remote Receiver Unmute, when measured from the instant the Remote Receiver Unmute signal is generated at a position, to the instant that Remote Receiver Unmute signal is present at the RRN legacy radio interface.

d. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that the unmute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.3.4 Radio Squelch Break and Indicator

a. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break signal is received or generated at the RRN legacy radio interface, to the instant the audio path is set up from the RRN legacy radio interface to the position(s) headset or loudspeaker.

b. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for Radio Squelch Break Indicator, when measured from the instant the squelch break signal is received or generated at the RRN legacy radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.3.5 Voice Delay

a. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice is received at the RRN legacy radio interface.

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b. The NVS must, for RCE Emulation between the AVN and the RRN, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant voice is present at the RRN legacy radio interface, to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.4 Position to/from R-RCE Legacy Radio Interface, RCE Emulation

3.2.2.1.1.4.1 PTT/PTT Release and Indicator

a. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT signal is present at the output of the R-RCE legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation signal is present at the legacy radio interface with the R-RCE, to the instant that indicator response is activated at the calling position.

c. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for PTT Release, when measured from the instant that the PTT signal is removed after the PTT switch breaks contact without waiting for debounce at the position, to the instant that the PTT signal is absent from the output of the R-RCE legacy radio interface.

d. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for PTT Release Indicator, when measured from the instant that a PTT confirmation signal is no longer present at the legacy radio interface with the R-RCE, to the instant that indicator response is deactivated at the calling position.

3.2.2.1.1.4.2 M/S TX/RX Transfer and Indicator

a. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer signal is present at the output of the R-RCE legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for M/S TX/RX Transfer Indicator, when measured from the instant that the M/S TX/RX transfer confirmation signal is present at the legacy radio interface with the R-RCE, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.4.3 Remote Receiver Mute/Unmute and Indicator

a. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute signal is present at the output of the R-RCE legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation signal is present at the R-RCE legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Remote Receiver Unmute, when measured from the instant the Remote Receiver Unmute signal is generated at a position to the instant that the Remote Receiver Unmute signal is present at the R-RCE legacy radio interface.

d. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that a unmute confirmation signal is present at the R-RCE legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.4.4 Radio Squelch Break and Indicator

a. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break signal is received or generated at the R-RCE legacy radio interface, to the instant the audio path is set up from the R-RCE legacy radio interface to the position(s) headset or loudspeaker.

b. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for Radio Squelch Break Indicator, when measured from the instant the squelch break signal is received or generated at the R-RCE legacy radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.4.5 Voice Delay

a. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice is received at the R-RCE legacy radio interface.

b. The NVS must, for RCE Emulation between the AVN and the R-RCE, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant voice is present at the R-RCE legacy radio interface to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.5 Position to/from AVN VoIP Radio Interface

3.2.2.1.1.5.1 A/G PTT/ PTT Release and Indicator

a. The AVN must, for VoIP Radios, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT message is present at the output of the AVN network interface.

b. The AVN must, for VoIP Radios, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation message is present at the AVN radio interface, to the instant that indicator response is activated at the calling position.

c. The AVN must, for VoIP Radios, meet the specified response time for A/G PTT Release, when measured from the instant that the PTT switch breaks contact without waiting for debounce at the position, to the instant that the PTT Release message is present at the output of the AVN radio interface.

d. The AVN must, for VoIP Radios, meet the specified response time for A/G PTT Release Indicator, when measured from the instant that a PTT confirmation message is no longer present at the AVN radio interface, to the instant that indicator response is deactivated at the calling position.

3.2.2.1.1.5.2 M/S TX/RX Transfer and Indicator

a. The AVN must, for VoIP Radios, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that the transfer message is present at the output of the AVN radio interface.

b. The AVN must, for VoIP Radios, meet the specified response time for M/S TX/RX Confirmation, when measured from the instant that the M/S TX/RX transfer confirmation message is present at the AVN radio interface, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.5.3 Remote Receiver Mute/Unmute and Indicator

a. The AVN must, for VoIP Radios, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute message is present at the output of the AVN radio interface.

b. The AVN must, for VoIP Radios, meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation message is present at the AVN radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The AVN must, for VoIP Radios, meet the specified response time for Remote Receiver Unmute, when measured from the instant a request is initiated at the position to the instant that Remote Receiver Unmute message is present at the AVN radio interface.

d. The AVN must, for VoIP Radios, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that Remote Receiver unmute confirmation message is present at the AVN radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.5.4 Radio Squelch Break and Indicator

a. The AVN must, for VoIP Radios, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break message is received at the AVN radio interface, to the instant the audio path is set up from the AVN radio interface, to the position(s).

b. The AVN must, for VoIP Radios, meet the specified response time for Radio Squelch Break Indicator from the instant the squelch break message is received or generated at the AVN radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.5.5 Voice Delay

a. The AVN must, for VoIP Radios, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice message is received at the AVN network interface.

b. The AVN must, for VoIP Radios, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant that the voice message is present at the AVN network interface to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.6 Position to/from RRN Legacy Radio Interfaces, VoIP

3.2.2.1.1.6.1 PTT/Release and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation signal is present at the legacy radio interface with the RRN, to the instant that indicator response is activated at the calling position.

c. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for PTT Release, when measured from the instant that the PTT signal is removed after the PTT switch breaks contact without waiting for debounce at the position, to the instant that the PTT signal is absent from the output of the RRN legacy radio interface.

d. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for PTT Release Indicator, when measured from the instant that a PTT confirmation signal is no longer present at the legacy radio interface with the RRN, to the instant that indicator response is deactivated at the position.

3.2.2.1.1.6.2 M/S TX/RX Transfer and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for M/S TX/RX Confirmation, when measured from the instant that the M/S TX/RX transfer confirmation signal is present at the legacy radio interface with the RRN, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.6.3 Remote Receiver Mute/Unmute and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with legacy radios , meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for Remote Receiver Unmute, when measured from the instant a request is initiated at the position to the instant that Remote Receiver Unmute signal is present at the RRN legacy radio interface.

d. The NVS must, for VoIP between the AVN and an RRN, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that the unmute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.6.4 Radio Squelch Break and Indicator

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a. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break signal is received or generated at the RRN legacy radio interface, to the instant the audio path is set up from the RRN legacy radio interface, to the position(s).

b. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for Radio Squelch Break

Indicator from the instant the squelch break signal is received or generated at the RRN legacy radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.6.5 Voice Delay

a. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone, to the instant that the voice is received at the RRN legacy radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with legacy radios, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant voice is present at the RRN radio interface to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.7 Position to/from RRN IP Radio Interface, VoIP

3.2.2.1.1.7.1 PTT/PTT Release and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact, without waiting for debounce at the position, to the instant a PTT message is present at the output of the RRN IP radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation message is present at the IP radio interface with the RRN, to the instant that indicator response is activated at the calling position.

c. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for PTT Release, when measured from the instant that PTT switch breaks contact without waiting for debounce at the position, to the instant that the PTT Release message is present at the output of the RRN IP radio interface.

d. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for PTT Release Indicator, when measured from the instant that a PTT confirmation message is no longer present at the IP radio interface with the RRN, to the instant that indicator response is deactivated at the position.

3.2.2.1.1.7.2 M/S TX/RX Transfer and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer message is present at the output of the RRN IP radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for M/S TX/RX Confirmation, when measured from the instant that the M/S TX/RX transfer confirmation message is present at the IP radio interface with the RRN, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.7.3 Remote Receiver Mute/Unmute and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute message is present at the output of the RRN IP radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation message is present at the RRN IP radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Remote Receiver Unmute, when measured from the instant a request is initiated at the position to the instant that Remote Receiver Unmute message is present at the RRN IP radio interface.

d. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that the unmute confirmation message is present at the RRN IP radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.7.4 Radio Squelch Break and Indicator

a. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break message is received at the RRN IP radio interface, to the instant the audio path is set up from the RRN legacy radio interface, to the position(s).

b. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for Radio Squelch Break Indicator from the instant the squelch break message is received at the RRN IP radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.7.5 Voice Delay

a. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice message is received at the RRN IP radio interface.

b. The NVS must, for VoIP between the AVN and an RRN with VoIP radios, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant that the voice message is present at the RRN IP radio interface, to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.1.8 VoIP to/from AVN Legacy Local Radio Interface, via AVN Gateway

3.2.2.1.1.8.1 PTT/PTT Release and Indicator

a. The AVN must, for legacy local radio Gateway, meet the specified response time for PTT, from the instant that the PTT message is present at the AVN network interface, to the instant a PTT signal is present at the output of the AVN radio interface.

b. The AVN must, for legacy local radio Gateway, meet the specified response time for an externally provided PTT confirmation, when measured from the instant that a PTT confirmation signal is present at the AVN radio interface, to the instant that the PTT confirmation message is present at the AVN network interface.

c. The AVN must, for legacy local radios that do not provide PTT confirmation for the Gateway, meet the specified response time from the instant the PTT Confirmation is generated by the AVN Radio Interface Equipment, to the instant that the PTT confirmation message is present at the AVN network interface.

d. The AVN must, for legacy local radio Gateway, meet the specified response time for PTT Release, from the instant that the message is present at the AVN network interface, to the instant that the PTT signal is absent at the output of the AVN radio interface.

e. The AVN must, for legacy local radio Gateway, meet the specified response time for an externally provided PTT Release Indicator, when measured from the instant that a PTT release confirmation signal is present at the AVN radio interface, to the instant that the PTT Release confirmation message is present at the AVN network interface.

f. The AVN must, for legacy local radios that do not provide PTT confirmation for the Gateway, meet the specified response time from the instant the PTT Release confirmation is generated by the AVN Radio Interface Equipment, to the instant that the PTT Release confirmation message is present at the AVN network interface.

3.2.2.1.1.8.2 M/S TX/RX Transfer and Indicator

a. The AVN must, for legacy local radio Gateway, meet the specified response time for M/S TX/RX Transfer from the instant that the M/S TX/RX transfer message is present at the AVN network interface, to the instant that this transfer signal is present at the AVN radio interface.

b. The AVN must, for legacy local radio Gateway, meet the specified response time from the instant the M/S TX/RX Transfer Confirmation is generated by the AVN Radio Interface Equipment to the instant that M/S TX/RX confirmation message is present at the AVN network interface.

3.2.2.1.1.8.3 Radio Squelch Break and Indicator

a. The AVN must, for legacy local radio Gateway, meet the specified response time for Radio Squelch Break from the instant that the squelch break signal is present at the AVN radio interface, to the instant the audio path is set up from the radio interface to the AVN network interface.

b. The AVN must, for legacy local radio interfaces that do not provide a squelch break signal for the Gateway, interpret the reception of voice signals from the local radio interface as a squelch break and set up the audio path between the radio interface and the AVN network interface.

c. The AVN must, for legacy local radio Gateway, meet the specified response time for Radio Squelch Break from the instant the squelch break signal is received or generated at the AVN radio interface, to the instant the squelch break message is present at the AVN network interface.

3.2.2.1.1.8.4 Voice Delay

a. The AVN must, for legacy local radio Gateway, meet the specified response time for the network interface- to-the radio interface one-way voice delay, when measured from the instant that the voice message is present at the AVN network interface, to the instant that the voice is received at the AVN radio interface.

b. The AVN must, for legacy local radio Gateway, meet the specified response time for the radio interface-to-network interface one-way voice delay, when measured from the instant voice is present at the AVN radio interface, to the instant that the voice message is present at the AVN network interface.

3.2.2.1.1.9 Position to/from RRN Legacy Radio Interface, via AVN Gateway & RCE Emulation

3.2.2.1.1.9.1 PTT/PTT Release and Indicator

a. The NVS must, for RCE Emulation Gateway, meet the specified response time for PTT, when measured from the instant that the PTT switch makes contact at the remote AVN position, without waiting for debounce, to the instant a PTT signal routed through the local AVN's gateway is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation Gateway, meet the specified response time for PTT Indicator, when measured from the instant that a PTT confirmation signal is present at the legacy radio interface with the RRN, to the instant the confirmation signal routed through the local AVN's gateway activates the indicator response at the remote AVN's calling position.

c. The NVS must, for RCE Emulation Gateway, meet the specified response time for PTT Release, when measured from the instant that the PTT switch breaks contact at the remote AVN, without waiting for debounce at the position, to the instant the removed PTT signal routed through the local AVN's gateway is absent from the output of the RRN legacy radio interface.

d. The NVS must, for RCE Emulation Gateway, meet the specified response time for PTT Release Indicator, when measured from the instant that a PTT confirmation signal is no longer present at the legacy radio interface with the RRN, to the instant the removed confirmation signal routed through the local AVN's gateway deactivates the indicator response at the remote AVN's calling position.

3.2.2.1.1.9.2 M/S TX/RX Transfer and Indicator

a. The NVS must, for RCE Emulation Gateway, meet the specified response time for M/S TX/RX Transfer, when measured from the instant that the M/S TX/RX transfer signal is generated at a position, to the instant that this transfer signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation Gateway, meet the specified response time for M/S TX/RX Confirmation, when measured from the instant that the M/S TX/RX transfer confirmation signal is present at the legacy radio interface with the RRN, to the instant that an indicator response signal is activated at the position that generated the M/S TX/RX selection signal.

3.2.2.1.1.9.3 Remote Receiver Mute/Unmute and Indicator

a. The NVS must, for RCE Emulation Gateway, meet the specified response time for Remote Receiver Mute, when measured from the instant that the Remote Receiver Mute signal is generated at a position, to the instant that this Remote Receiver Mute signal is present at the output of the RRN legacy radio interface.

b. The NVS must, for RCE Emulation Gateway, meet the specified response time for Remote Receiver Mute indicator, when measured from the instant that the mute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver muting signal.

c. The NVS must, for RCE Emulation Gateway, meet the specified response time for Remote Receiver Unmute, when measured from the instant the Remote Receiver Unmute signal is generated at a position, to the instant that Remote Receiver Unmute signal is present at the RRN legacy radio interface.

d. The NVS must, for RCE Emulation Gateway, meet the specified response time for Remote Receiver Unmute indicator, when measured from the instant that the unmute confirmation signal is present at the RRN legacy radio interface, to the instant that an indicator response signal is activated at the position that generated the remote receiver unmuting signal.

3.2.2.1.1.9.4 Radio Squelch Break and Indicator

a. The NVS must, for RCE Emulation Gateway, meet the specified response time for Radio Squelch Break, when measured from the instant that the squelch break signal is received or generated at the RRN legacy radio interface, to the instant the audio path is set up from the RRN legacy radio interface to the position(s) headset or loudspeaker.

b. The NVS must, for RCE Emulation Gateway, meet the specified response time for Radio Squelch Break Indicator, when measured from the instant the squelch break signal is received or generated at the RRN legacy radio interface to the instant the squelch break indication is presented at the position(s).

3.2.2.1.1.9.5 Voice Delay

a. The NVS must, for RCE Emulation Gateway, meet the specified response time for the position-to-radio interface one-way voice delay, when measured from the instant voice is present at the position's microphone to the instant that the voice is received at the RRN legacy radio interface.

b. The NVS must, for RCE Emulation Gateway, meet the specified response time for the radio interface-to-position one-way voice delay, when measured from the instant voice is present at the RRN legacy radio interface, to the instant that voice is received at the position headset or loudspeaker.

3.2.2.1.2 Ground-To-Ground Performance

The following G/G performance requirements are define the measurement of the parameters specified in TABLE 3-8, subject to the traffic loads, blocking probabilities, and call distribution during the Peak Busy Hour (PBH) and Peak Busy Minute (PBM) conditions shown in TABLE 3-6 and TABLE 3-7.

The use of the term “NVS” in this section will be inclusive of two AVN’s. The dotted lines shown in FIGURE 3-4 illustrate the various paths of the G/G events listed in TABLE 3-8.

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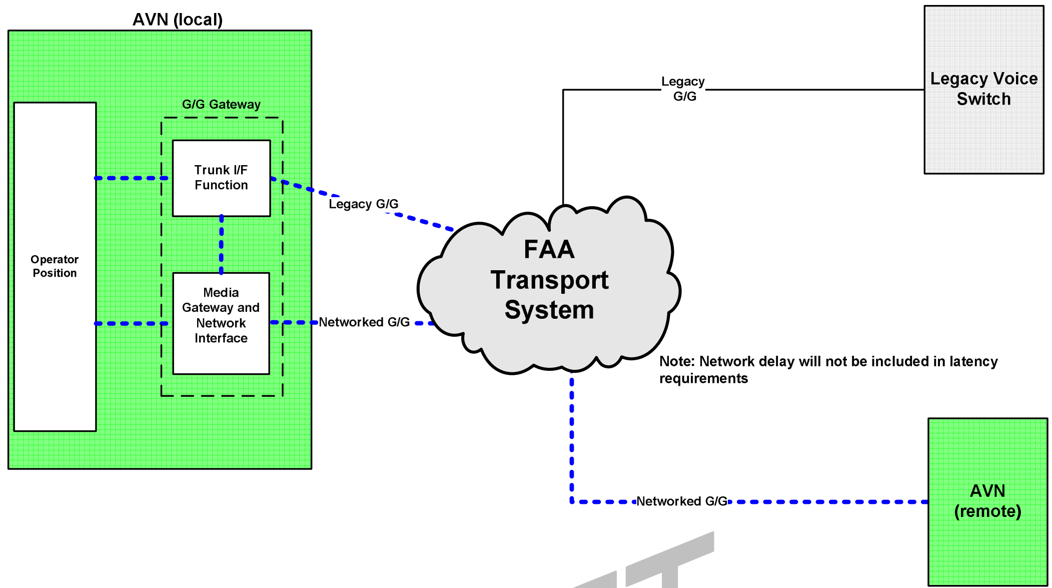

FIGURE 3-4. G/G Performance Paths

3.2.2.1.2.1 G/G Functions within the AVN

3.2.2.1.2.1.1 G/G PTT/PTT Release

a. The AVN must meet the specified response time for G/G PTT, when measured from the instant that a PTT signal is generated at the position, without waiting for debounce at the position, to the instant that voice transmission over the established path can begin.

b. The AVN must meet the specified response time for G/G PTT Release, when measured from the instant that a PTT signal is terminated at the position, without waiting for debounce at the position, to the instant that voice transmission ceases from the position.

3.2.2.1.2.1.2 Conference Call Operations

a. The AVN must meet the specified response time for Conference Call Select, when measured from the instant that a valid operator action is initiated at the position (This action may include a single touch action, entry of appropriate IA function code sequence, or both), to the instant that the conference participant voice path is added to the conference.

b. The AVN must meet the specified response time for Conference Call Indicator, when measured from the instant that a valid operator action is initiated at the position (This action may include a single touch action, entry of appropriate IA function code sequence, or both), to the instant that visual indication of conference call initiation appears on the position display device.

c. The AVN must meet the specified response time for Conference Call Deselect, when measured from the instant that a valid release action is initiated at the position, to the instant that the releasing conference participant voice path is dropped from the conference.

3.2.2.1.2.1.3 Call Hold/Resume Operations

a. The AVN must meet the specified response time for Call Hold, when measured from the instant that a valid operator action is initiated at the position, to the instant that the active call audio path is disconnected to position.

b. The AVN must meet the specified response time for Call Resume, when measured from the instant that a valid operator action is initiated at the position, to the instant that the held call audio voice path is reconnected to the position.

3.2.2.1.2.1.4 Call Forward Operations

a. The AVN must meet the specified response time for Call Forward Select, when measured from the instant that valid operator action is initiated at the position (the Call Forward Select action may include either a single touch action to a DA designator, or entry of the destination position number on the IA keypad), to the instant that the call forwarding function is engaged at the position.

b. The AVN must meet the specified response time for Call Forward Select Confirmation, when measured from the instant that valid operator action is initiated at the position (this action may include either a single touch action to a DA designator, or entry of the destination position number on the IA keypad), to the instant that the visual confirmation of call forwarding activation appears on the position display device.

c. The AVN must meet the specified response time for Call Forward Deselect, when measured from the instant that the valid IA function code sequence is initiated at the position, to the instant that the call forwarding function is disengaged at the position.

d. The AVN must meet the specified response time for Unacceptable Call Forward Alert, when measured from the instant that valid operator request is initiated at the position, (this action may include a either single touch action to a DA designator, or entry of the destination position number on the IA keypad), to the instant that an alert action (audio or visual) is engaged at the position.

3.2.2.1.2.1.5 Call Transfer Operations

a. The AVN must meet the specified response time for Call Transfer Selection, when measured from the instant that the valid operator request is initiated at the position (this action may include either a single touch action to a DA designator, or entry of the designation, position number on the IA keypad), to the instant an indication is given to the transferred-to-position.

b. The AVN must meet the specified response time for Unacceptable Call Transfer Alert, when measured from the instant that a valid operator request is initiated at the position (this action may include a either single touch action to a DA designator, or entry of the destination position number on the IA keypad), to the instant that an alert action (audio or visual) is engaged at the position.

3.2.2.1.2.1.6 Call Retrieval from Common Answer Queue

a. The AVN must meet the specified response time for Call Retrieval from Common Answer Queue, when measured from the instant that valid operator select request of call in answer queue is initiated at the position (either specified call or longest held call), to the instant that the selected held call's audio voice path is available at the position.

b. The AVN must meet the specified response time for Confirm Calls In Common Answer Queue, when measured from the instant that valid IA call is placed in the CA queue of the called position, to the instant that a visual indication of incoming IA call appears on the called position's display device.

3.2.2.1.2.1.7 IA Keypad Selection

a. The AVN must meet the specified response time for IA & IA Override Selection, when measured from the instant that a valid “IA" key press on the position IA keypad is initiated to the instant that IA keypad is available for input (regardless of whether OVR or not).

3.2.2.1.2.2 Position to/from Position, same facility

3.2.2.1.2.2.1 IC Call Placement/Acceptance/Release and Indicator

a. The AVN must meet the specified response time for IC Call Placement, whether it be a two-party IC call or an IC addition to a progressive or preset conference call, when measured from the instant that the address is generated at the position, to the instant that the called position is notified by appropriate AVN internal signaling.

b. The AVN must meet the specified response time for IC Call Operation Indicator, when measured from the instant that a request is initiated at the position to the instant that visual indication of IC call appears on both the originating and terminating position display devices.

c. The AVN must meet the specified response time for IC Call Ringback Tone, when measured from the instant that a valid address is initiated at the position (IA/DA) to the instant that a ring back tone is connected to the position.

d. The AVN must meet the specified response time for IC Busy Tone, when measured from the instant that a valid address is generated at the position (IA/DA) to the instant that a busy tone is connected to the position.

e. The AVN must meet the specified response time for Call Acceptance, whether it be a two-party IC call or an IC addition to a progressive or preset conference call, when measured from the instant that the called position accepts the IC call, to the instant that an indicator response (ringback tone stops) is activated at the calling position, and voice communications over the established path can begin.

f. The AVN must meet the specified response time for IC Circuit Release, when measured from the instant that the release signal is initiated at the releasing position, to the instant that the voice circuit is released

g. The AVN must meet the specified response time for IC OVR Call Placement/Acceptance, when measured from the instant that the address is generated at the position, to the instant that the Calling (Placement) and Called (Acceptance) positions are notified and voice communications can begin over the OVR voice channel established between the positions.

3.2.2.1.2.2.2 Voice Delay

a. The AVN must meet the specified position-to-position one-way voice delay, when measured from the instant voice is present at the transmitting position's microphone to the instant that the voice is received at the receiving position's headset or loudspeaker.

3.2.2.1.2.3 Position to/from AVN legacy Trunk Interface (Interphone)

3.2.2.1.2.3.1 Interphone Call Placement/Acceptance/Release

a. The AVN must meet the specified response time for Position-To-Trunk Interphone Call Placement exclusive of type 5 trunks, whether it is an individual position-to-trunk Interphone call or an Interphone addition to a progressive or preset conference call, when measured from the instant that the address is generated at the position, to the instant that any signaling is initiated at the AVN trunk interface.

b. The AVN must meet the specified response time for Trunk-To-Position Interphone Call Placement, exclusive of type 5 trunks, when measured from the instant that the complete called address is confirmed at the trunk interface to the AVN, to the instant that the called position is notified (by a call indicator response).

c. The AVN must meet the specified response time for Position-To-Trunk Interphone Call Acceptance, exclusive of type 5 trunks, when measured from the instant that the called position accepts the incoming Interphone call, to the instant that the Interphone call acceptance message signaling is initiated at the AVN trunk interface.

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d. The AVN must meet the specified response time for Trunk-To-Position Interphone Call Acceptance, whether it be an individual position-to-trunk Interphone Call or an addition to a progressive or preset conference call, when measured from the instant the Interphone acceptance message is confirmed at the trunk interface to the AVN, to the instant the calling position is notified (by a call indicator response), and voice communication over the established path can begin.

e. The AVN must meet the specified response time for Interphone Circuit Release, when measured from the instant that the release signal is initiated at the releasing position, to the instant that the voice circuit connection is confirmed as released and the releasing position receives the proper indication response.

f. The AVN must, for Interphone Circuit Release, if the releasing position is external to the AVN, meet the specified response time, when measured from the instant that the releasing signal is confirmed at the AVN trunk interface, to the instant that the voice circuit connection is confirmed as released and the position within the AVN receives proper indicator response.

g. The AVN must, when Interphone circuit provides dial tone, meet the specified response time for Dial Tone For Indirect Access, when measured from the instant that the IA keypad is activated, to the instant that the dial tone is activated

h. The AVN must meet the specified response time for Position-To-Trunk Interphone OVR Call Placement, when measured from the instant that the address is generated at the position, to the instant that appropriate Interphone OVR signaling is initiated at the AVN trunk interface.

i. The AVN must meet the specified response time for Trunk-To-Position Interphone OVR Call Acceptance, when measured from the instant that appropriate Interphone OVR signaling is confirmed at the trunk interface, to the instant that the called position is notified of the call by appropriate AVN internal signaling.

3.2.2.1.2.3.2 Voice Delay

a. The AVN must meet the specified response time for the position-to-trunk interface one-way voice delay, when measured from the instant voice is present at the position's microphone, to the instant that the voice is received at the AVN trunk interface.

b. The AVN must meet the specified response time for the trunk-to-position one-way voice delay, when measured from the instant that voice is present at the AVN trunk interface, to the instant that the voice is received at the position's headset or loudspeaker.

3.2.2.1.2.4 Position to/from AVN VoIP Interface

3.2.2.1.2.4.1 Call Placement/Acceptance/Release and Indicator

a. The AVN must meet the specified response time for Call Placement, whether it be a two-party call or an addition to a progressive or preset conference call, when measured from the instant that the address is generated at the position, to the instant that the Call Placement message is present at the AVN network interface.

b. The AVN must meet the specified response time for Call Acceptance, whether it be a two-party call or an addition to a progressive or preset conference call, when measured from the instant that the called position message is present at the AVN network interface, to the instant that an indicator response is present at the calling position and voice communications over the established path can begin.

3.2.2.1.2.4.2 Voice Delay

a. The AVN must meet the specified response time for the position-to-network interface one-way voice delay, when measured from the instant voice is present at the position's microphone, to the instant that the voice message is received at the AVN network interface.

b. The AVN must meet the specified response time for the network-to-position one-way voice delay, when measured from the instant that the voice is present at the AVN network interface, to the instant that the voice is received at the position's headset or loudspeaker.

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3.2.2.1.2.5 Position to/from AVN Legacy Trunk Interface via AVN Gateway

3.2.2.1.2.5.1 Interphone Call Placement/Acceptance/Release

a. The NVS must , for Trunk Interface Gateway, meet the specified response time for Position-To-Trunk Interphone Call Placement, exclusive of type 5 trunks, whether it is an individual position-to-trunk Interphone call or an Interphone addition to a progressive or preset conference call, when measured from the instant that the address is generated at the remote AVN position, to the instant that any signaling routed through the local AVN's Gateway is initiated at the trunk interface.

b. The NVS must, for Trunk Interface Gateway, meet the specified response time for Trunk-To-Position Interphone Call Placement, exclusive of type 5 trunks, when measured from the instant that the complete called address is confirmed at the trunk interface to the local AVN, to the instant that the confirmation routed through the local AVN's gateway notifies the called position at the remote AVN.

c. The NVS must, for Trunk Interface Gateway, meet the specified response time for Position-To-Trunk Interphone Call Acceptance, exclusive of type 5 trunks, when measured from the instant that the called position at the remote AVN accepts the incoming Interphone call, to the instant that the Interphone call acceptance message signaling routed through the local AVN's gateway is initiated at the trunk interface.

d. The NVS must, for Trunk Interface Gateway, meet the specified response time for Trunk-To-Position Interphone Call Acceptance, whether it be an individual position-to-trunk Interphone Call or an addition to a progressive or preset conference call, when measured from the instant the Interphone acceptance message is confirmed at the trunk interface to the local AVN, to the instant the confirmation routed through the local AVN's gateway notifies the calling position (by a call indicator response) at the remote AVN, and voice communication over the established path can begin.

e. The NVS must, for Trunk Interface Gateway, meet the specified response time for Interphone Circuit Release, when measured from the instant that the release signal is initiated at the releasing position at the remote AVN, to the instant that the voice circuit connection is confirmed as released and the releasing position at the remote AVN receives the proper indication response.

f. The NVS must, for Trunk Interface Gateway, meet the specified response time for Interphone Circuit Release, if the releasing position is external to the remote AVN, when measured from the instant that the releasing signal is confirmed at the local AVN trunk interface, to the instant the confirmation routed through the local AVN gateway releases the circuit at the remote AVN position and the position receives the proper indicator response.

g. The NVS must, for Trunk Interface Gateway when Interphone circuit provides dial tone, meet the specified response time for Dial Tone For Indirect Access, when measured from the instant that the IA keypad is activated, to the instant that the dial tone is activated

h. The NVS must, for Trunk Interface Gateway, meet the specified response time for Position-To-Trunk Interphone OVR Call Placement, when measured from the instant that the address is generated at the remote AVN position, to the instant that appropriate Interphone OVR signaling routed through the local AVN gateway is initiated at the trunk interface.

i. The NVS must, for Trunk Interface Gateway, meet the specified response time for Trunk-To-Position Interphone OVR Call Acceptance, when measured from the instant that appropriate Interphone OVR signaling is confirmed at the trunk interface to the local AVN, to the instant that the confirmation routed through the local AVN's gateway notifies the called position at the remote AVN by the appropriate signaling.

3.2.2.1.2.5.2 Voice Delay

a. The NVS, for Trunk Interface Gateway, must meet the specified response time for the position-to-trunk interface one-way voice delay, when measured from the instant voice is present at the remote AVN's position's microphone, to the instant that the voice routed through the local AVN's gateway is received at the trunk interface.

b. The NVS, for Trunk Interface Gateway, must meet the specified response time for the trunk-to-position one-way voice delay, when measured from the instant that voice is present at the local AVN trunk interface, to the instant that the voice routed through the local AVN's gateway is received at the remote AVN's position's headset or loudspeaker.

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3.2.2.1.3 Position Functions within the AVN

3.2.2.1.3.1 Position Voice Monitor Selection/Confirmation

a. The AVN must meet the specified response time for Position Voice Monitor Selection, when measured from the instant that a valid operator action is initiated at the position (this action may include either single touch action to a DA designator, or entry of an IA function code and position identifier number), to the instant that the selected position's audio voice path is available at the monitoring position.

b. The AVN must meet the specified response time for Voice Monitor Selection Confirmation, when measured from the instant that a valid operator action is initiated at the position (this action may include a single touch action to a DA designator, or entry of an IA function code and position identifier number), to the instant that visual indication of voice monitor activation appears on the monitoring position's display device.

3.2.2.1.3.2 Position Split Functionality Mode Events

a. The AVN must meet the specified response time for Position Split Functionality Mode Enable, when measured from the instant that the position function is initiated by manual control to the instant the split audio path is established, A/G monitoring is established, an additional legal recorder channel is available.

b. The AVN must ensure that during the enabling of position split functionality mode, a position is not be without functional communications for more than one (1) second under the traffic loads specified in TABLE 3-6 and TABLE 3-7.

c. The AVN must meet the specified response time for Position Split Functionality Mode Disable, when measured from the instant the function is manually deselected or all headsets are removed from either HS jack module, until normal audio path is established.

d. The AVN must ensure that during the disabling of split functionality mode a position is not be without functional communications for more than one (1) second under the traffic loads specified in TABLE 3-6 and TABLE 3-7.

3.2.2.2 System Errors

a. The NVS must ensure that the internal errors within the NVS do not exceed the limits listed in TABLE 3-9 and specified below.

b. The NVS must ensure that for 1,000,000 calls transmitted throughout the system, not more than one false disconnect of a circuit occurs due to any internal NVS errors.

c. The NVS must ensure that for each 1,000,000 user requests for service, not more than one false request for service is initiated by internal NVS errors.

d. The NVS must ensure that the error rate for transmitting or decoding addresses does not exceed one erroneous call per 1,000,000 calls.

e. The NVS must ensure that the error rate for PTT activation and PTT release does not exceed 10 to the minus 10 power.

TABLE 3-9. System Errors

Description	Maximum Error Rate
False Service Disconnect	10^{-6}
False Request For Service	10^{-6}
Incorrect Dial Code Access	10^{-6}
Push-to-Talk Error	10^{-10}

3.2.2.3 Degraded Operations

a. The NVS must, if either unanticipated emergency traffic conditions exceed NVS traffic capabilities or internal system failures occur, service requests on a priority basis to ensure air safety.

b. The NVS must assign highest priority to all A/G communications.

c. The NVS must, after A/G communications, assign decreasing priorities according to the following order: first, IC; Interphone; maintenance functions; second, data collection and third, support functions, which receive lowest priority functions.

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3.2.2.4 Voice Channel Performance

3.2.2.4.1 Impedance

a. The NVS must, for each voice frequency (VF) circuit within the system present a nominal impedance of 600 ohms for two-wire and four-wire trunks and circuits to its interface in accordance with the requirements set forth in the NVS IRDs.

b. The NVS must provide an option of 900 ohms for two-wire trunks and circuits to its interface in accordance with the requirements set forth in the NVS IRDs.

3.2.2.4.2 Background Noise

a. The NVS must ensure that the combined hum and noise level of any single receive voice path within a NVS, measured at the position jacks with the headset volume control set to nominal, with both ends of the path properly terminated, does not exceed 16 dBrnc for the C-message weighted noise and 35 dBrn for the 3 kHz flat noise.

b. The NVS must permit this test be performed with the AGC enabled.

c. The NVS must ensure that the combined hum and noise level of any single transmit voice path within a NVS, measured at the interface with external equipment, with both ends of the path properly terminated, does not exceed 20 dBrnC0 for the C-message noise and 35 dBrn for the 3 kHz flat noise.

3.2.2.4.3 Idle Channel Noise

a. The NVS must ensure that with the input terminated in the nominal impedance, noise measured at the output does not exceed 23 dBrnC0.

b. The NVS must permit this test be performed with the AGC enabled.

3.2.2.4.4 Impulse Noise

a. The NVS must ensure that the peak level of impulse-type noise generated within the NVS, when measured on a single idle voice path, as defined and

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b. The NVS must permit this test to be performed with the AGC enabled.

3.2.2.4.5 Crosstalk Between Channels

a. The NVS must ensure that the crosstalk coupling loss between any transmit or receive path of an independent VF circuit or between any digital signal transmit and receive path through NVS electronics is greater than or equal to 72 dB.

b. The NVS must permit this test to be performed with the AGC disabled.

3.2.2.4.6 Frequency Response

a. The NVS must ensure that the frequency response for all frequencies between 300 and 3000 Hz is within -0.1 to +1.0 dB (where + equals more loss and - equals less loss) of the 1000-Hz amplitude level measured at the voice channel output.

b. The NVS must ensure that the test input signal is at the standard telephony test tone level of 0dbm0.

c. The NVS must, to protect other services from interference due to frequencies that are above the voice band, ensure that the signal applied to NVS interfaces does not exceed the limits specified in TABLE 3-10.

d. The NVS must permit this test to be performed with AGC disabled.

TABLE 3-10. Frequency Response Characteristics

Frequency, kHz	Maximum Power Below Zero Transmission Level Point, dB
3.955 to 4.005	-28 (15 dB below - 13 dBm)
4.0 to 10.0	-16
10.0 to 25.0	-24
25.0 to 40.0	-36
Above 40.0	-50

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3.2.2.4.7 Distortion

3.2.2.4.7.1 Intermodulation Distortion

a. The NVS must, when measured with the four-tone test method, which involves the transmission of four equal level tones (856, 863, 1374, 1385 Hz) at a given composite level of -13 dBmO, ensure that the intermodulation distortion parameters do not exceed the values given in TABLE 3-11.

b. The NVS must permit this test must be performed twice.

c. The NVS must permit the first test to be performed with the AGC disabled.

d. The NVS must permit the second test to be performed with the AGC enabled.

TABLE 3-11. Intermodulation Distortion

Connection	Decibels below received power (max), dB R2*
Position to Position	40
Position to trunk	45
Position to Network Element	45
*R2 is the average of the power level in the 503 to 537 Hz and 2223 to 2257 Hz bands expressed in dB below the received power level.	

3.2.2.4.7.2 Harmonic Distortion

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a. The NVS must ensure that the total harmonic distortion in a voice circuit produced by the second and third harmonics of a 1004-Hz test tone at -9 dBm if injected at a position jack or -9 dBm0 if injected at a voice path interface with external equipment is at least 45 dB below the test tone at the point of measurement.

b. The NVS must permit this test to be performed twice.

c. The NVS must permit the first test to be performed with AGC disabled.

d. The NVS must permit the second test to be performed with AGC enabled.

3.2.2.4.8 Longitudinal Balance

a. The NVS must ensure that over the frequency range of 300 Hz to 3000 Hz, the longitudinal balance conforms to the specifications of TABLE 3-12.

b. The NVS must permit this test to be performed with AGC disabled.

TABLE 3-12. Longitudinal Balance

Frequency, Hz	Minimum Balance, dB
300	58
500	58
1000	58
3000	53

3.2.2.4.9 Gain Tracking Linearity

a. The NVS must ensure that the linearity of each transmission path through the NVS is such that, for a 1004 Hz sine wave signal, the gain of the NVS tracks the gain of a 0 dBm0 input signal as specified in TABLE 3-13.

b. The NVS must, when a 6 dB change occurs, ensure that the output level settles in accordance with TABLE 3-13 within 50 ms from the instant of input level change.

c. The NVS must permit this test to be performed with AGC disabled.

TABLE 3-13. Gain Tracking Linearity

Input Level, dBm0	Gain Deviation (max), dB
+3 to -37	± 0.5
-37 to -50	± 1.0

3.2.2.4.10 Hybrid Balance

a. The NVS must, for each two-wire-trunk interfaces, ensure the NVS meets mandatory hybrid balance requirements in TIA/EIA-464-C-1996 paragraph 5.5.1 for standard interface off premise station (OPS).

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3.2.2.4.11 Return Loss

a. The NVS must, for a position-to-two-wire interface, ensure that a minimum echo return loss of 18 dB and a minimum single-frequency return loss of 12 dB.

b. The NVS must, for delays over 10 ms, ensure that any position-to-two-wire-trunk connection has the Talker Echo Path Loudness Loss (TEPLL) verses Talker Echo Path Delay (TEPDC) relationship(s) on or to the right of the curves presented for Class A1 systems in Figure 12 and Figure 13 of IEEE-STD-823-1989.

c. The NVS must permit this test to be performed with AGC disabled.

3.2.2.4.12 Voice Signal Through Multiple Paths

a. The NVS must, if under any operational condition a position receives the same voice signal through more than one path within the system, except due to override or override/monitor loop closure, ensure the delay between any two of these voice signals do not exceed 20 ms.

b. The NVS must, if under any operational condition a position receives the same voice signal through more than one path within the system, except due to override or override/monitor loop closure, ensure the delayed signal(s) is attenuated by at least 10 db for 99.99% of all event completions.

c. The NVS must, if a position receives the same voice signal through more than one path due to audio closure of an override or override/monitor loop, ensure the delay between any two of these voice signals does not exceed the product of x and y, where x equals 20 ms and y equals the number of positions in the override/monitor conference minus two.

d. The NVS must attenuate the delayed signals by at least 10dB for 99% of all event completions at those positions receiving voice signals, due to audio loop closure.

3.2.2.4.13 VF Level Regulation

a. The NVS must provide automatic gain control (AGC) to regulate voice levels.

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b. The NVS must regulate the level of VFs between 300 and 3000 Hz when transmitted and received at position.

c. The NVS must provide regulation that accommodates a 12-dB sudden increase in input signal.

d. The NVS must ensure that the instantaneous output level, including transients, does not increase by more than 5 dB or decrease by more than 3 dB.

e. The NVS must ensure that the output level remains within +/-0.5 dB of the final steady-state value within 10 ms from the instant of 12-dB sudden increase input level change.

f. The NVS must permit 12-dB sudden increase to be performed with AGC enabled.

g. The NVS must provide regulation that accommodates a 12-dB sudden decrease in input signal.

h. The NVS must, immediately following the 10-ms stabilization period after the 12-dB increase, and with a sudden 12-dB decrease, ensure the output stabilizes to within 2 dB of the final steady-state value in not less than 400 and no more than 600 ms from the instant of input level change.

i. The NVS must permit 12-dB decrease to be performed with AGC enabled.

3.2.2.4.13.1 Transmit Level Regulation

a. The NVS must ensure that the nominal input test tone is 1004 Hz at a level of -9.0 dBm injected at the jack module.

b. The NVS must provide automatic voice level regulation in all transmitting voice paths from any position to maintain a level within +/-1.5 dB of the nominal output level.

c. The NVS must ensure that the nominal output level is -9.0 dBm0

d. The NVS must ensure that the level regulation operating range is +15 dB, -19 dB of the nominal input test tone level as shown in FIGURE 3-5.

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e. The NVS must, when the input signal is below the regulation threshold, comply with the gain tracking linearity requirements in section 3.2.2.4.9.

f. The NVS must permit authorized personnel to adjust the threshold level at the position over a range of -10 dB to +6 dB of nominal in increment of 1 dB.

g. The NVS must provide a means for authorized personnel to enable the AGC function.

h. The NVS must provide a means for authorized personnel to disable the AGC function.

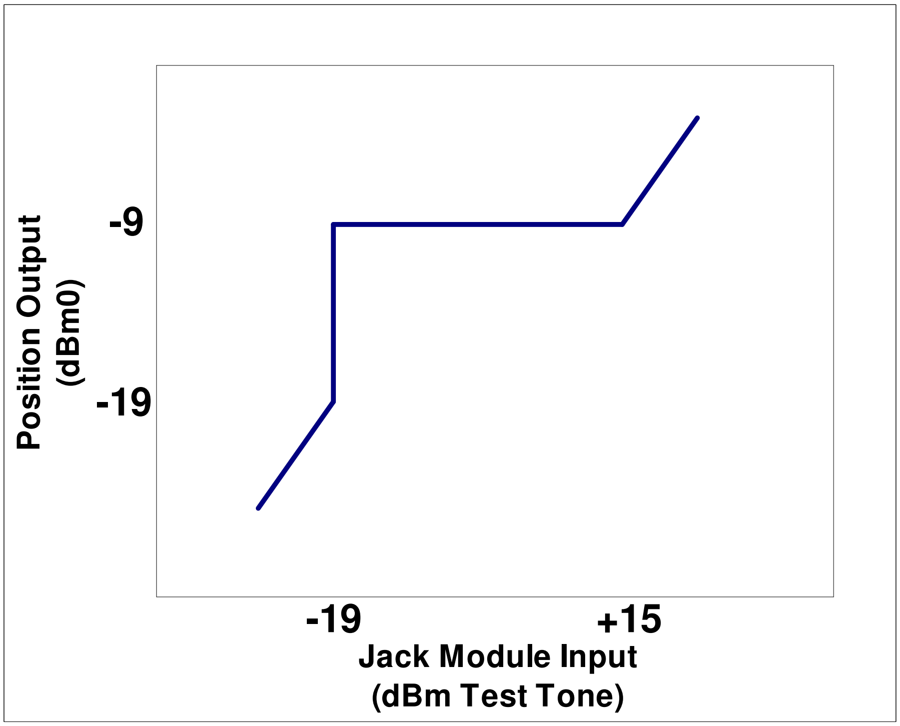

FIGURE 3-5. Transmit Level Regulation

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3.2.2.4.13.2 Receive Level Regulation

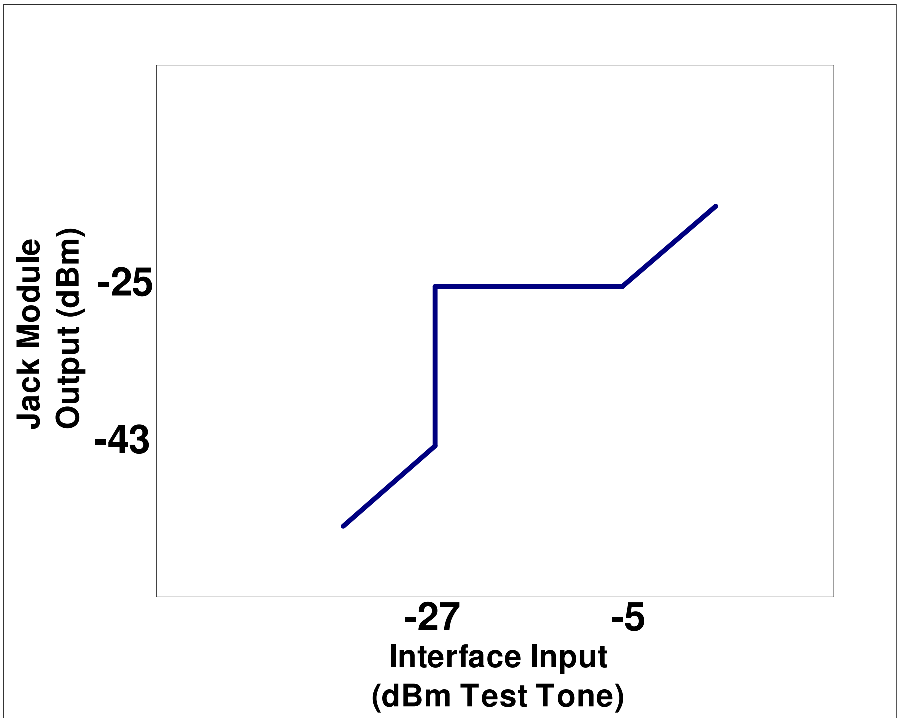

FIGURE 3-6. Receive Level Regulation

a. The NVS must provide automatic voice level regulation at the interface in the receiving voice paths from all Interphone circuits.

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b. The NVS must provide automatic voice level regulation at the interface in the receiving voice paths from all A/G circuits.

c. The NVS must provide automatic voice level regulation at the interface in the receiving voice paths from all PABX circuits.

d. The NVS must provide automatic voice level regulation at the interface in the receiving voice paths from all external IC circuits.

e. The NVS must provide a 26 dB regulation window in the received path measured at the position headset jack.

f. The NVS must regulate the receive level at the position headset jack to within +/-1.5 dB of the nominal value of -27 dBm with the headset volume control set to nominal as shown in FIGURE 3-6.

g. The NVS must provide a nominal threshold level at -17 dBm0.

h. The NVS must permit authorized personnel to adjust the threshold level at each trunk interface over a range of -10 dB to +6 dB of nominal in increment of 1 dB.

i. The NVS must permit authorized personnel to adjust the threshold level at each radio interface over a range of -10 dB to +6 dB of nominal in increment of 1 dB.

j. The NVS must, when the input signal is below the regulation threshold, comply with the gain tracking linearity requirements in section 3.2.2.4.9.

k. The NVS must permit this test to be performed with AGC enabled.

l. The NVS must provide a means for authorized personnel to enable the AGC function on a per circuit basis.

m. The NVS must provide a means for authorized personnel to disable the AGC function on a per circuit basis.

3.2.2.4.13.3 Multiple Access Level Regulation

a. The NVS must ensure that the cumulative loss at a position due to multiple access in override (OVR) mode does not exceed 3 dB.

b. The NVS must ensure that the cumulative loss due to multiple access to an Interphone circuit does not exceed 3 dB.

c. The NVS must ensure that the cumulative loss due to access to multiple distribution of a single trunk up to the maximum number of positions at a facility does not exceed 3 dB.

d. The NVS must ensure that the cumulative loss at a position due to multiple access of network interfaces does not exceed 3 dB.

e. The NVS must permit these tests to be performed with AGC enabled.

3.2.2.4.13.4 Measurement Method

a. The NVS must use the standard test method for transmission performance characteristics specified in section 4.8.2 of IEEE-STD-7431995, or equivalent.

b. The NVS must have the test equipment built-in into the maintenance position.

c. The NVS must use the built-in test equipment to perform measurement of all items specified in Paragraph 3.2.2.4.1 through 3.2.2.4.13.3.

3.2.2.4.14 HS Jack Volume Limiter

a. The NVS must, as configured by authorized personnel, provide a headset audio limiting function, with the options and associated characteristics as described in TABLE 3-14.

b. The NVS must limit signal in accordance with TABLE 3-14 regardless of HS volume setting.

c. The NVS must provide the headset limiting function after any tone elimination function and volume control function has been engaged.

d. The NVS must for any frequency between 300 and 3000 Hz meet the values specified in TABLE 3-14 measured into 600 ohms.

e. The NVS must absolutely limit any signal presented to any headset receive jack to -9 dBm, regardless of the input level.

f. The NVS must provide an audio limiting function for receive sidetone audio in accordance with TABLE 3-14, except with maximum level adjusted for sidetone attenuation as described in paragraph 3.1.2.3.6.d.

g. The NVS must permit HS Jack Volume limiter tests to be performed with the headset volume set to maximum and AGC disabled.

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TABLE 3-14. HS Jack Volume Limiter

		Step Increase			Step Decrease		
	Max HS level (dBm)	**Step Change (dBm)**	**Settling Envelope**	**Settling Time**	**Step Change (dBm)**	**Settling Envelope**	**Settling Time**
Option E	-20	-22 to -12	± 2dB	10ms	-12 to -22	± 1 dB	450ms
		-35 to -10	± 1 dB	120ms	-10 to -35	± 1 dB	600ms
Option T	-12	-14 to -4	± 2dB	10ms	-4 to -14	± 1 dB	450ms
		-27 to -2	± 1 dB	120ms	-2 to -27	± 1 dB	600ms

3.2.2.4.15 Tone Elimination

a. The NVS must permit the removal of tones in the HS audio path of each jack and loudspeaker.

b. The NVS must provide tone elimination at the operator position.

c. The NVS must prohibit suppressing information tones as identified in TABLE 3-15.

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d. The NVS must simultaneously suppress at least two tones from the audio path when voice is present in the audio band between 300 Hz and 4000 Hz.

e. The NVS must simultaneously suppress at least two tones from the audio path when no voice is present in the audio band between 300 Hz and 4000 Hz.

f. The NVS must prohibit suppressing voice by misinterpreting it as a tone.

g. The NVS must permit authorized personnel to enable the tone suppression filter at the operator position.

h. The NVS must permit authorized personnel to disable the tone suppression filter at the operator position.

i. The NVS must generate a traffic data record when the tone suppression filter capability is disabled.

j. The NVS must generate a traffic data record when the tone suppression filter is enabled.

k. The NVS must generate a maintenance log data record when the tone suppression filter is enabled.

l. The NVS must generate a maintenance log data record when the tone suppression filter is disabled.

m. The NVS must provide a visual indication at the position when the enabled tone suppression filter has detected and removed from the audio path any unwanted tone.

n. The NVS must provide a maintenance data record when the suppression filter has detected and removed from the audio path any unwanted tone(s).

o. The NVS must provide a tone suppression attack time no greater than 50 ms for initial tone.

p. The NVS must provide a tone suppression attach time no greater than 100 ms for all simultaneous tones.

q. The NVS must provide a tone suppression release time no greater than 50 ms.

r. The NVS must ensure that the depth of the suppression introduced is at least 30 dB for all tones suppressed.

s. The NVS must, when position volume control is set to nominal, ensure that the filter(s) activates for unwanted tone(s) at or above a level equal to –40 dBm.

TABLE 3-15. Tone Table

Ringback Tones	Call Progress Indicators
Busy tones	Emergency Locator Transmitter (ELT)
DTMF tones	Momentary audible indications (zip tones)
Reorder tones	Other information tones required

3.2.2.4.16 VOX Operation

a. The NVS must, on any interface using voice activated circuitry (VOX), ensure immediate activation of the circuit upon receipt of incoming voice, without distortion of incoming speech.

b. The NVS must, on any interface using voice activated circuitry (VOX), ensure immediate activation of the circuit upon receipt of incoming voice, without suppression of incoming speech.

c. The NVS must permit authorized personnel to adjust the VOX detection threshold from -50 dBm to +2.9 dBm input to the interface in 1 dB increments.

d. The NVS must permit authorized personnel to adjust the VOX detection threshold on a per circuit basis.

e. The NVS must permit authorized personnel to adjust the VOX attack time from 0 to 500 ms configurable in 5 ms increments.

f. The NVS must permit authorized personnel to adjust the VOX release time from 100 to 5,000 ms configurable in 10 ms increments.

g. The NVS must, on any interface using voice activated circuitry (VOX), ensure activation of the circuit upon receipt of incoming voice at or above the specified VOX detection threshold level.

3.2.2.4.17 Speech Quality

a. The NVS must provide a minimum Mean Opinion Score - Listening Quality Objective (MOS-LQO) score of 4.0 in accordance with ITU-T P.862 and P.862.1 for all non RCE voice communications.

b. The AVN must, with tone notching enabled, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the AVN's external interface to the position headset.

c. The AVN must, with the HS jack volume limiter enabled, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the AVN's external interface to the position headset.

d. The AVN must, with the transmit level regulation enabled, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the position microphone to the AVN's external interface.

e. The AVN must, with the receive level regulation enabled, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the AVN's external interface to the position headset.

f. The NVS must, for an RCE interface between the AVN and RRN, provide a minimum MOS-LQO score of 3.4 in accordance with ITU-T P.862 and P.862.1, when measured from the AVN's position microphone to the RRN's radio interface.

g. The NVS must, for an RCE interface between the AVN and RRN, provide a minimum MOS-LQO score of 3.4 in accordance with ITU-T P.862 and P.862.1, when measured from the RRN's radio interface to the AVN's position headset.

h. The NVS must, for a VoIP interface between the AVN and RRN, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the AVN's position microphone to the RRN's radio interface.

i. The NVS must, for a VoIP interface between the AVN and RRN, provide a minimum MOS-LQO score of 4.0 in accordance with ITU-T P.862 and P.862.1, when measured from the RRN's radio interface to the AVN's position headset.

3.2.2.4.17.1 Voice Coding

a. The NVS must support voice coding according to ITU-T G.711 PCM A-law.

b. The NVS must support voice coding according to ITU-T G.711 PCM μ-law.

c. The NVS must support voice compression according to ITU-T G.728 LD-CELP algorithm.

d. The NVS must support voice compression according to ITU-T G.729 CS-ACELP algorithm.

3.2.2.4.18 Transmission Plan

a. The NVS must ensure that the analog communications interfaces conform to the transmission plan described in FIGURE 3-7 and FIGURE 3-8.

b. The AVN must ensure that the zero transmission level point (0TLP) is the microphone input at the position.

c. The AVN must permit authorized personnel to adjust each trunk/circuit input power level between +12 and -16 dB relative to the level at the zero transmission level point specified in the analog transmission plan.

d. The AVN must permit authorized personnel to adjust each trunk/circuit output power level between +12 and -16 dB relative to the level at the zero transmission level point specified in the analog transmission plan.

e. The NVS must permit authorized personnel to adjust each radio interface input power level between +12 and -16 dB relative to the level at the zero transmission level point specified in the analog transmission plan.

f. The NVS must permit authorized personnel to adjust each radio interface output power level between +12 and -16 dB relative to the level at the zero transmission level point specified in the analog transmission plan.

g. The NVS must use a test tone level of -9 dBm relative to the 0TLP.

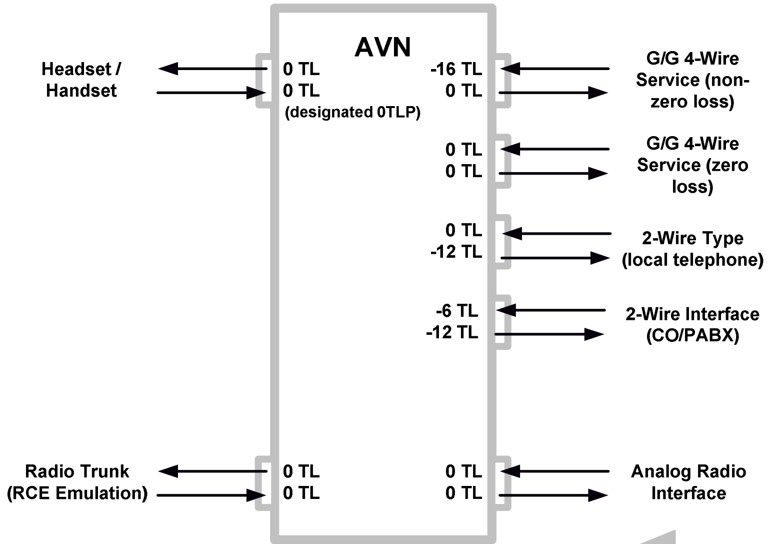

FIGURE 3-7. AVN Transmission Plan

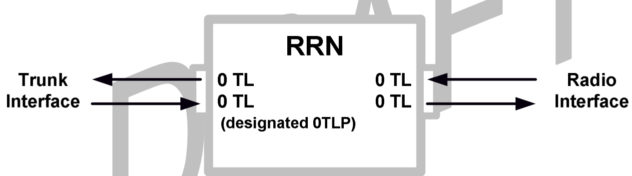

FIGURE 3-8. RRN Transmission Plan

3.2.3 System Startup

a. The NVS must perform a system startup upon initial installation.

b. The NVS must require no more than 5 minutes after power is applied to establish full system functionality.

c. The NVS must, excluding workstations, return to the individual configuration settings that were in use prior to a loss of power.

d. The NVS must automatically perform diagnostics on all functional areas on system startup.

e. The NVS must report the results of startup diagnostics to all authorized workstations.

f. The NVS must download the configuration data base and operational programs.

3.3 Interfaces

3.3.1 General

This section provides a list of the external interfaces supported by the NVS. Select external interfaces requirements are covered herein and others are defined in the pertinent Interface Requirements Documents (IRDs).

a. The AVNmust ensure that all G/G interfaces and PABX are interchangeably installable in the same circuit location.

b. The NVS must ensure that all radio interfaces are interchangeably installable in the same circuit location.

c. The NVS must ensure that all network interfaces are interchangeably installable in the same circuit location.

3.3.2 NVS to Radio Subsystem

a. The NVS must interface to local and remote radio equipment in accordance with the NVS to Radio Subsystem IRD.

b. The NVS must interface with the radio network in accordance with EUROCAE ED-137 Specification Part 1.

3.3.3 NVS to Legal Voice Recorder

a. The AVN must interface to the legal voice recording system as described in the NVS to Voice Recorder IRD.

b. The AVN must interface with the legal voice recording system in accordance with EUROCAE ED-137 Specification Part 3.

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3.3.4 NVS to PABX

a. The AVN must interface to the PABX as described in the NVS to Analog Interphone IRD.

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3.3.5 NVS to Government Provided Transport System

a. The NVS must interface to the FAA Transport System as described in the NVS to Government Provided Transport System IRD.

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3.3.6 NVS to Analog Interphone

a. The AVN must interface to legacy interfaces as described in the NVS to Analog Interphone IRD.

3.3.7 NVS to CONUS-NORAD Region (CONR)

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a. The AVN must provide a four-wire, single frequency capable, Ground to Ground trunk interface to CONR.

b. The AVN must convert the in-band, single frequency (SF) 2400 Hz tone signaling on the CONR trunk for PTT control.

c. The AVN must interpret the presence of a 2400 Hz tone on the trunk as the signal to activate PTT (contact closure).

d. The AVN must interpret the absence of a 2400 Hz tone on the trunk as the signal to deactivate PTT (contact closure).

3.3.8 NVS to Console

a. The AVN must provide operator position modules, including the TED, jack module, speaker, volume controls and any other module(s) interfaced by the position operator, that are enclosed by an external casing and can be mounted as a stand-alone device.

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b. The AVN must provide all operator position modules with mounting hole patterns conforming to the Video Electronics Standards Association (VESA) Flat Display Mounting Interface (FDMI).

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3.3.8.1 AVN Console Equipment Characteristics

The following sections define the characteristics of the operator position equipment that will be provided by the AVN for mounting in RADAR operator position and Tower operator position consoles.

3.3.8.1.1 Touch Entry Display (TED)

3.3.8.1.1.1 Radar Operator Position TED Panel Space

a. The AVN must provide RADAR operator position TEDs capable of being installed within a 7.75 inches wide by 7.90 inches high panel cutout that is centered to the overall width and has an overall width of less than or equal to 10.00 inches.

b. The AVN must ensure the RADAR operator position TEDs protrude less than or equal to 1.00 inch above the console mounting.

c. The AVN must ensure the RADAR operator position TEDs (including any cable connectors connected at 90° bend) protrude less than or equal to 4.50 inches into the panel cutout.

3.3.8.1.1.1.1 Radar Operator Position TED Mounting Options

The intent of the fixed position angle mounts are to provide upper bezels that tilt back 3°±1° from vertical and lower bezels that tilt back 15°±3° from vertical when mounted on a console tilted back 25° from vertical. The angle mounts are to also be rotated 30° towards the operator. This will accommodate the location of the RADAR operator position TEDs to the side of the radar display in front of which the controller is sitting.

a. The AVN must provide optional fixed position angle mounts to enhance visual and touch access to the RADAR operator position TED relative to the operator's position.

b. The AVN must use one of four types of angle mounts for the RADAR operator position TED at each operator's position (relative to the operator's position at the console) as ordered by the Government:

1) Upper-left;

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2) Lower-left;

3) Upper-right;

4) Lower-right.

c. The AVN must match the front of the angle mounts with the contour of the TED perimeter within ± 1/8 inch if the angle mount utilizes an enclosure that mates with the perimeter of the RADAR operator position TED frame.

d. The AVN must ensure that the mounting footprint of the angle mount on the position console falls within the mounting footprint of the RADAR operator position TED, as specified in 3.3.8.1.1.1.

e. The AVN must ensure that the cutout required for any part of the angle mount and/or TED to penetrate the console falls within the cutout of the RADAR operator position TED, as specified in 3.3.8.1.1.1.

f. The AVN must ensure that the angle mount is designed so that the top and bottom edges of the attached RADAR operator position TED are horizontal within ± 1/8 inch.

g. The AVN must fully enclose the angle mounts from the console to the RADAR operator position TED.

h. The AVN must ensure that the angle mounts have ventilation holes on the sides and bottom only (not the top) to prevent objects and liquids from reaching or damaging the RADAR operator position TED if ventilation holes are required for proper heat dissipation.

i. The AVN must ensure that the movement of the RADAR operator position TED is equal to or less than 1/32 inch in any direction when a force of 60 lbs is applied at any point in any direction on the angle mount/TED assembly once the angle mount is installed to the console and the TED to the angle mount.

j. The AVN must match the color and finish of the angle mount to the RADAR operator position TED frame.

k. The AVN must ensure that all angle mount and RADAR operator position TED/frame surfaces are smooth with no sharp edges.

l. The AVN must round the exposed edges and corners for the angle mount and the RADAR operator position TED/frame surfaces in accordance with DOT/FAA/CT HF-STD-001 paragraphs 12.5.1.4 and 12.5.1.5.

m. The AVN must avoid (or at least cover) small projecting components for the angle mount and the RADAR operator position TED/frame surfaces in areas where maintainers must make rapid movements in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.6.

n. The AVN must avoid locating latches, levers, cranks, hooks, and controls for the angle mount and the RADAR operator position TED/frame surfaces where they can pinch, snag, or cut the maintainers or their clothing in accordance with DOT/FAA/CT HF-STD-001 paragraphs 12.5.1.7 and 12.5.1.8.

o. The AVN must ensure that the exposed surface for the angle mount and the RADAR operator position TED/frame surfaces that can be grasped by the bare hand are free of burrs in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.9.

p. The AVN must cap the bolts for the angle mount and the RADAR operator position TED/frame surfaces with more than two exposed threads to protect the maintainer from the sharp threads in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.10.

3.3.8.1.1.1.1.1 Upper-left Fixed Position Angle Mounts for RADAR Operator Position TED

a. The AVN must utilize upper-left angle mounts that create a 30° ± 1° tilt angle from the console surface to the RADAR operator position TED display, from right to left, as shown in Figure 3-9.

b. The AVN must utilize upper-left angle mounts that create a 3° ± 1° tilt angle from vertical to the RADAR operator position TED display, from bottom to top, as shown in Figure 3-10.

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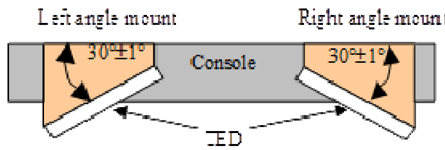

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FIGURE 3-9. Top View of RADAR Operator Position TED Angle Mounts

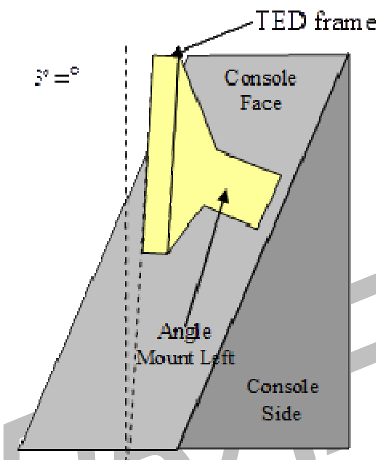

FIGURE 3-10. Upper Angle Mount Layout for Radar Operator Position TED

3.3.8.1.1.1.1.2 Lower-left Position Angle Mounts for RADAR Operator Position TED

a. The AVN must utilize lower-left angle mounts that create a 30° ± 1° tilt angle from the console surface to the RADAR operator position TED display, from right to left, as shown in Figure 3-9.

b. The AVN must utilize lower-left angle mounts that create a 15° ± 3° tilt angle from vertical to the RADAR operator position TED display, from bottom to top, as shown in Figure 3.11.

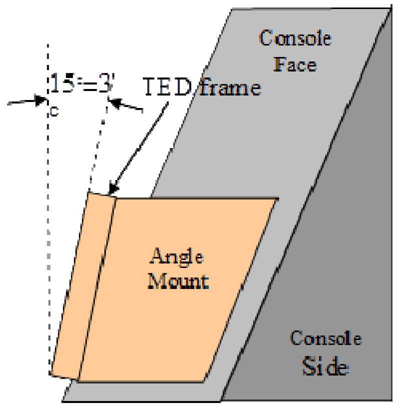

FIGURE 3-11. Lower Angle Layout for Radar Operator Position TED

3.3.8.1.1.1.1.3 Upper-right Fixed Position Angle Mounts for RADAR Operator Position TED

a. The AVN must utilize upper-right angle mounts that create a 30° ± 1° tilt angle from the console surface to the RADAR operator position TED display, from left to right, as shown in Figure 3-9.

b. The AVN must utilize upper-right angle mounts that create a 3° ± 1° tilt angle from vertical to the RADAR operator position TED display, from bottom to top, as shown in Figure 3-10.

3.3.8.1.1.1.1.4 Lower-right Fixed Position Angle Mounts for RADAR Operator Position TED

a. The AVN must utilize lower-right angle mounts that create a 30° ± 1° tilt angle from the console surface to the RADAR operator position TED display, from left to right, as shown in Figure 3-9.

b. The AVN must utilize lower-right angle mounts that create a 15° ± 3° tilt angle from vertical to the RADAR operator position TED display, from bottom to top, as shown in Figure 3-11.

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3.3.8.1.1.1.1.5 Dimensional Constraints for RADAR Operator Position TED

a. The AVN must ensure that the width of the mounted TED, TED frame, and angle mount is less than or equal to 10.00 inches perpendicular to the console surface on which the RADAR operator position TED is mounted, as shown in Figure 3-12.

b. The AVN must ensure that the protuberance of the mounted TED, TED frame, and angle mount is less than 6.00 inches horizontally from the bottom foremost edge of the TED frame to the console surface on which the RADAR operator position TED is mounted, as shown in Figure 3-13.

c. The AVN must ensure that the height of the mounted TED, TED frame, and angle mount for the RADAR operator position is less than 12.00 inches perpendicular to vertical, as shown in Figure 3-13.

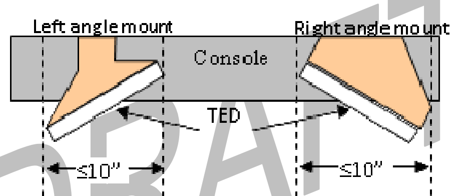

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FIGURE 3-12. Top View of Dimensional Constraints for RADAR Operator Position TED

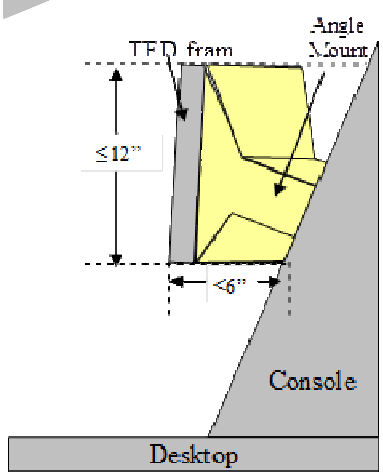

FIGURE 3-13. Side View of Dimensional Constraints for RADAR Operator Position TED

3.3.8.1.1.2 Tower Operator Position TED Panel Space

a. The AVN must fit the Tower operator position TED within a panel space of less than or equal to 10.00 inches wide by 12.00 inches high by 9.50 inches deep (including clearance for cabling and connectors).

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3.3.8.1.1.2.1 Tower Operator Position TED Hinge & Lock Mechanism

a. The AVN must provide an optional mechanism for the tower operator position TED that allows adjustment of the vertical angle of the TED relative to the operator's panel to enhance the visual and touch access to the TED and reduce light reflection to the operator.

b. The AVN must ensure that the mechanism for the tower operator position TED rotates from parallel to the operator's panel up towards the operator.

c. The AVN must ensure that the mechanism for the tower operator position TED provides hard stops at 11°, 19°, 27°, 35° and 43° ± 1° measured from parallel to the surface of the console in which the TED is mounted.

d. The AVN must ensure that the mechanism for the tower operator position TED will be able to be rotated with only one-handed operation using intuitive and obvious motions.

e. The AVN must ensure that the mechanism for the tower operator position TED requires less than 6 pounds of force to rotate up or down.

f. The AVN must ensure that the movement of the optional mechanism for the tower operator position TED is less than or equal to 1/32 inch in any direction, when a force of 15 pounds is applied at any point on the TED.

g. The AVN must ensure that the adjustable mechanism for the tower operator position TED has ventilation holes for heat dissipation.

h. The AVN must prohibit the use of ventilation holes on the top of the mechanism for the tower operator position TED to prevent objects and liquids from reaching or damaging the TED and console equipment.

i. The AVN must ensure that the mechanism for the tower operator position TED prohibits any openings that can allow objects to fall into the mechanism.

j. The AVN must ensure that the mechanism for the tower operator position TED prohibits any openings that can allow objects to fall into the operator's console.

k. The AVN must ensure that the mechanism for the tower operator position TED prohibits any openings that can become shearing, pinching, or crushing points.

l. The AVN must match the color and finish of the mechanism for the tower operator position TED to the TED frame.

m. The AVN must ensure that all tower operator position TED mechanism surfaces are smooth with no sharp edges.

n. The AVN must round the exposed edges and corners for the tower operator position TED mechanism surfaces in accordance with DOT/FAA/CT HF-STD-001 paragraphs 12.5.1.4 and 12.5.1.5.

o. The AVN must avoid (or at least cover) small projecting components for the tower operator position TED mechanism surfaces in areas where maintainers must make rapid movements in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.6.

p. The AVN must avoid locating latches, levers, cranks, hooks, and controls for the tower operator position TED mechanism surfaces where they can pinch, snag, or cut the maintainers or their clothing in accordance with DOT/FAA/CT HF-STD-001 paragraphs 12.5.1.7 and 12.5.1.8.

q. The AVN must ensure that exposed surfaces for the tower operator position TED mechanism that can be grasped by the bare hand are free of burrs in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.9.

r. The AVN must cap bolts for the tower operator position TED mechanism with more than two exposed threads to protect the maintainer from the sharp threads in accordance with DOT/FAA/CT HF-STD-001 paragraph 12.5.1.10.

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3.3.8.2 Jack Modules

a. The AVN must provide operator position jack modules capable of being installed in the console bullnose in a space of less than or equal to 2.00 inches high by 7.00 inches wide by 12.00 inches deep (including clearance for cabling and connectors).

b. The AVN must provide a means to recess the operator position jack modules from 1.50 inches to up to 2.00 inches from the bullnose surface.

3.3.8.3 Speaker Modules

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a. The AVN must provide operator position speaker modules capable of being installed inside the operator position console within a panel space of less than or equal to 5.72 inches high by 4.57 inches wide by 10.00 inches deep (including clearance for cabling and connectors).

b. The AVN must ensure that operator position speaker modules are capable of being installed in overhead panels at greater than or equal to 20 cable feet from any other operator position module associated with the operator position it supports.

3.3.8.4 Control Module

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a. The AVN must provide operator position control modules, if required by the AVN design, capable of being installed inside the operator position console within a panel space of less than or equal to 5.72 inches high by 4.57 inches wide by 10.00 inches deep (including clearance for cabling and connectors).

3.3.8.5 Operator Position Equipment Electronic Support Module

a. The AVN must provide operator position equipment electronic support modules, if required by the AVN design, capable of being installed inside the operator position console within a space of less than or equal to 9.00 inches wide by 5.00 inches high by 22.00 inches deep.

b. The AVN must provide position equipment support modules, if required by design, capable of being installed less than or equal to 50 cable feet from any other operator position module associated with the operator position it supports.

3.3.9 Traffic Simulation Unit

a. Reserved.

3.3.10 Position Interfaces

3.3.10.1 Headsets/Headset (HS)

a. The AVN must provide a microphone interface with a nominal input impedance of 50 ohms.

b. The AVN must supply a microphone bias current of at least 25 mA into a 180 ohm load, but not to exceed 130 mA.

c. The AVN must, based upon an input signal of –10dbm0 at 1,004 Hz at the microphone interface, provide a receive output (headset) interface capable of providing 38.8 ± 5 mV across 600 ohms (nominally -26 dBm) when the NVS position volume control is set to –16TL

d. The AVN must provide a nominal output impedance of no greater than 600 ohms to the headset earpiece.

e. The AVN must provide a headset interface, which prevents erroneous PTT activation upon insertion of the headset plug into the jackbox.

f. The AVN must interface with GFE headsets via a long-frame 6-wire plug with dual tip/ring/sleeve (i.e., PJ-7 or equivalent).

3.3.10.2 Handheld Microphone

a. The AVN must, as ordered by the government, provide a hand-held microphone interface.

b. The AVN must provide a hand-held microphone jack with a four-pin Switchcraft D4FD or equivalent in form, fit, and function.

c. The AVN must provide a hand-held microphone jack with an input impedance of between 50 and 500 ohms.

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d. The AVN must provide a hand-held microphone jack with a carbon-compatible input supplying a nominal DC bias current of at least 25mA into 500 ohms.

e. The AVN must provide a hand-held microphone jack that detects when a handheld microphone is connected to the jack.

3.3.11 Door Release

a. The AVN must, upon activation of a door release selector, provide contact closure to the corresponding facility entry door release interface.

b. The AVN must, as ordered by the government, provide up to six contact closures rated at a minimum of 1 ampere at 120V ac to operate government-furnished door unlock solenoids.

c. The AVN must, as ordered by the government, provide up to six contact closures rated at a minimum of 2 amperes at 30V dc to operate government-furnished door unlock solenoids.

3.3.12 NVS to Power

a. The NVS must connect to the government provide power in accordance with the NVS to Power IRD.

3.3.13 NVS to NVS

a. The NVS must interface with the telephone network in accordance with EUROCAE ED-137 Specification Part 2.

3.4 Reliability, Maintainability and Availability (RMA), and Service Life Requirements

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3.4.1 Reliability

a. The NVS must preclude the propagation of a failure to other resources, devices, components, or assemblies.

b. The NVS must limit the impact of the failure of individual components to single functions.

c. The NVS must, limit the impact of the failure of individual components to single resources.

d. The NVS must be designed with no single point of failure.

e. The NVS must automatically switchover to redundant equipment, as available, in the event of a failure.

3.4.1.1 AVN Reliability

a. The AVN must have a system Mean Time Between Critical Failure (MTBCF) of greater than 50,000 hours.

b. The AVN must base a Critical Failure on the cumulative number of A/G, G/G, and position resources with a Loss of Service as defined in Table 3-16.

c. The AVN must base a Critical Failure on the cumulative number of A/G resources with a Loss of Service as defined in Table 3-16.

TABLE 3-16. AVN Critical Failure Parameters

AVN Sizing per Number of Operator Positions	AVN Critical Failure[1]: Min. Cumulative A/G, G/G and Position resources with Loss of Service[2]	AVN Critical Failure[1]: Min. Cumulative A/G Resources with Loss of Service[2]
1 to 10	2	2
11 to 20	3	2
21 to 30	4	2
31 to 40	5	3
41 to 50	6	3
51 to 60	7	3
61 to 70	8	4
71 to 80	9	4
81 to 90	10	5
91 to 100	11	5
101to 110	12	6
111 to 120	13	6
121 to 130	14	7
131to 140	15	7
141 to 150	16	8

AVN Sizing per Number of Operator Positions	AVN Critical Failure[1]	
	Min. Cumulative A/G, G/G and Position resources with Loss of Service[2]	**Min. Cumulative A/G Resources with Loss of Service[2]**
Greater than 150	Based on 10% of number of operator positions[3]	Based on 5% of number of operator positions[3]

Notes:
1. Either or both events can occur for a Critical Failure.
2. A "Loss of Service" is defined as any of the following:
   a. Interruption exceeding 300 ms in an A/G or G/G communication in progress.
   b. Failure to meet the throughput timing specified in Table 3-8 by more than 200%
3. When percentage of # of operator positions is not an integer (has a decimal or fraction), number must be rounded up to the next whole number (i.e., 11.2 would become 12)

d. The AVN must have a combined Mean Time Between Failure (MTBF) of greater than 200 hours for an AVN sized with 200 operator positions, 200 A/G legacy radio connections, 200 A/G IP radio connections, 200 G/G Legacy connections, and 200 G/G IP connections.

e. The AVN must have a combined MTBF that is directly scalable to the AVN defined in (d) with an MTBF of 200 hours. (i.e., an AVN, with 800 of each resource defined in (d), will need to have an MTBF of greater than 50 hours and an AVN, with 4 of each resource defined in (d), will need to have an MTBF of greater than 10,000 hours)

3.4.1.1.1 AVN Redundancy

a. The AVN must, when redundant equipment is available, automatically switch to the redundant equipment upon detection of a failure.

b. The AVN must ensure that automatic switchover to failed equipment is prohibited.

c. The AVN must permit manual switching to redundant equipment by authorized personnel.

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<#>The NVS must use a computerized model based on FAA Handbook 006A (FAA Reliability, Maintainability, and Availability (RMA) Handbook) to determine the system Mean-Time-Between-Failures (MTBF).¶
<#>The NVS must use a computerized model based on FAA Handbook 006A (FAA Reliability, Maintainability, and Availability (RMA) Handbook) to determine LRU Mean-Time-Between-Failures (MTBF).¶
<#>The NVS must define a system failure as the cumulative loss of 10% or more of the A/G, G/G, and position resources attributable to the NVS.¶
<#>The NVS must define a system failure as the cumulative loss of 5% or more of the A/G, resources attributable to the NVS.¶
<#>The NVS must define a system failure as the loss of an OVR call attributable to the NVS.¶

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<#>The NVS must, by design, limit the impact of the failure of individual components to single resources.¶
<#>Single Point of Failure¶
<#>The NVS must be designed with no single point of failure. ¶
<#>The NVS must automatically switchover to redundant equipment, as available, in the event of a failure.¶
<#>The NVS must ensure that the recovery time is within limits specified in 3.4.3.2.¶

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d. The AVN must ensure that manual switchover to failed equipment is prohibited.

e. The AVN must switch to the redundant equipment without degrading system performance.

f. The AVN must ensure that the automatic switching time to restore any function is no more than 200 ms.

g. The AVN must ensure that the manual switching time to restore any function is no more than 200 ms.

3.4.1.1.1.1 Exercising of Redundant Equipment

a. The AVN must permit authorized personnel to schedule automatic switching to any redundant equipment.

b. The AVN must permit authorized personnel to define, by LRU, what equipment is included in the scheduled switching.

c. The AVN must permit authorized personnel to define when the scheduled automatic switching is performed.

d. The AVN must support up to 31 user defined automatic switching sessions.

e. The AVN must, when failed redundant equipment recovers, ensure that reverted switching is prohibited.

3.4.1.2 RRN Reliability

a. The RRN must have an MTBF of greater than 30,000 hours.

3.4.1.3 NVSMS Reliability

a. The NVSMS must have an MTBF of greater than 20,000 hours.

3.4.2 AVN Availability

a. The AVN must use inherent availability to drive the reliability and maintainability requirements for the AVN.

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b. The AVN must ensure that the specified availability is achieved through system design.

c. The AVN must demonstrate system availability by using reliability and maintainability parameters obtained from analysis, test, and similar components/systems.

d. The AVN must meet the inherent availability A(i), for each AVN function. A(i) = MTBCF(f) / [MTBCF(f) + MTTR(f)] where: A(i) = inherent availability, inclusive of hardware failures caused by software; MTBCF(f) = mean time between critical failures as defined in 3.4.1.1; MTTR(f) = mean time to repair as defined in 3.4.3.2 (a).

d. The AVN must exhibit an inherit availability A(i) of at least 0.99999.

e. The AVN must, when configured as a Primary AVN, exhibit an inherit availability A(i) of at least 0.99999

f. The AVN must, when configured as a Primary AVN, include in the inherit availability A(i) defined in (e), any functions and equipment required to transfer between the Primary AVN and Backup AVN.

g. The AVN must, when configured as a Backup AVN, exhibit an inherit availability A(i) of at least 0.99999.

h. The AVN must, when configured as a Backup AVN, include in the inherit availability A(i) defined in (g), any functions and equipment required to switch between the Primary AVN and Backup AVN.

3.4.3 Maintainability

3.4.3.1 LRU Replacement

a. The NVS must permit all modules and equipment to be completely removable from their enclosure without excessive disassembly in accordance with FAA Handbook 006.

b. The NVS must allow the replacement of any LRUs without removal of adjacent LRU(s).

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<#>Position-Level Availability¶
<#>The AVN must provide position-level inherent availability based on the (critical and non-critical) functions to be performed at the position.¶
<#>The AVN must ensure that all failures of A/G communications or OVR calls, delineated as critical failures in TABLE 3-16, do not exceed 200% of the specified throughput timing in the 99.99 percentile column of TABLE 3-16.¶
<#>The AVN must ensure that all non-critical position functional failures do not exceed 500% of the specified throughput timing in the 99.99 percentile column of TABLE 3-16 or one second, whi ... [52]
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c. The NVS must allow the replacement of any LRUs without removal of any cabling not associated with the replaced LRU.

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d. The NVS must allow maintenance actions on any LRUs without impacting the operation of any redundant LRU(s).

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e. The NVS must ensure that no maintenance action requires the simultaneous labor of more than two persons.

3.4.3.1.1 Maintenance Design

a. The NVS design must meet the maintenance requirements of FAA Order 1100.127D Regional Office and System Management Office Organizational Structure - Functions.

b. The NVS design must meet the maintenance requirements of FAA Order 6000.15 General Maintenance Handbook for NAS Facilities.

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3.4.3.2 Time to Repair

a. The NVS must, excluding administrative and logistical time, exhibit a Mean Time To Repair (MTTR) less than or equal to 30 minutes for any single corrective maintenance action, including time required for fault localizing, repair, test, and restoration to service.

b. The NVS must, excluding administrative and logistical time, require less than or equal to 90 minutes for any single corrective maintenance action, including time required for fault localizing, repair, test, and restoration to service.

c. The NVS must, excluding administrative and logistical time, require less than or equal to 15 minutes for Floor Replaceable Units (FRUs), including time required for fault localizing, repair, test, and restoration to service.

3.4.3.3 Preventive Maintenance

a. The RRN must meet the functional and performance requirements of this specification, without the need for preventative maintenance.

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b. The AVN must require a preventive maintenance interval of greater than or equal to six months.

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c. The AVN must ensure that preventive maintenance does not require service interruption on more than one position at a time.

d. The AVN must ensure that preventive maintenance does not require service interruption on more than one external interface at a time.

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e. The AVN must ensure that periodic maintenance requires less than or equal to 30 minutes of scheduled downtime for any operational communications resource.

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f. The NVS must, excluding administrative and logistical time, ensure that preventive maintenance requires less than or equal to 2 hours per visit, regardless of system size.

g. The NVS must count any failure to any function used in operations that occurs during a preventive maintenance action, as corrective maintenance.

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3.4.3.4 Replacement of Consumable

a. The NVS must ensure that consumable or items subject to high failure rate (e.g., light bulbs, filters or cartridges) do not cause service interruption or require de-soldering to replace.

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b. The RRN must exclude consumables or items subject to high failure rate (i.e., light bulbs, filters or cartridges).

3.4.4 Service Life

a. The NVS must provide 100% duty cycle, continuous 24 hours a day, 7 days a week operation.

b. The NVS must, with proper maintenance, continue to meet the functional and performance requirements of this specification continuously throughout a service life of at least 20 years of continuous use.

3.5 Design Requirements

3.5.1 Physical Design Requirements

This section provides the physical (electrical and mechanical) design requirements that apply to all NVS equipment, unless otherwise noted.

a. The RRN must, with all associated cables connected, fit into a standard 19" wide rack panel opening.

b. The RRN's depth must be no more than 19" including all connecting cables.

c. The RRN's height must be no more than 3 1/2" (2U) for the unit itself including temperature isolation.

d. The RRN must weigh no more than 10 pounds.

3.5.1.1 Electrical Requirements

3.5.1.1.1 Electric Power

a. The NVS must sustain no damage to equipment when ac power outside the limits specified in the NVS to Power IRD is furnished for operation, including total loss of power.

b. The NVS must sustain transient AC power interruptions of up to 500 ms without degradation of operations.

c. The NVS must sustain transient AC power interruptions of up to 500 ms without interruption of operations.

3.5.1.1.2 Power Supplies

a. The NVS must ensure that each power supply has a front-panel ON-OFF switch.

b. The NVS must ensure that the position ON-OFF switch is located out of the controller's normal range of motion to prevent accidental activation.

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c. The NVS must ensure that each power supply contains electronic circuitry to prevent damage caused by external short circuits.

d. The NVS must ensure that the power supply recover immediately upon the removal of external short circuits.

e. The NVS must ensure that the electronic short circuit protection circuit allows removal or addition of electronic modules of capacitive loads to be switched ON without causing any circuit protection devices to operate or induce any other side effects.

f. The NVS must ensure that each power supply includes circuitry to activate a remote alarm at classmarked workstations.

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g. The NVS must ensure that the power supplies allow power-on installation or removal of NVS plug-in assemblies without degradation to the NVS or any NVS assembly.

h. The NVS must ensure that each power supply provides current output measure status indication via the network to classmarked workstations.

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i. The NVS must ensure that each power supply provides voltage output measure status indication via the network to classmarked workstations.

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3.5.1.1.3 Reserve Power Supply

a. The AVN, as ordered by the government, must provide a reserve power supply to permit the system to continue operations without performance degradation for a period of at least 20 minutes of continuous out-of-spec power conditions (e.g., outages, brownouts or sags, loss of phases, over voltages, etc.) when under the traffic loads specified in TABLE 3-6 and TABLE 3-7.

b. The AVN must provide reserve power for each workstation.

c. The AVN must maintain uninterrupted service during transitions between main and reserve power.

d. The AVN must provide visible and momentary audible alarms at the supervisory and maintenance positions and other locations to be identified at the time of order, to indicate each transition to reserve power.

e. The AVN must provide continuous visible and momentary audible alarms at the supervisory and maintenance positions and other locations to be identified at the time of order, whenever the power remaining in the reserve power system is insufficient for more than five minutes of continued operation for fully populated system configuration.

f. The AVN must provide a reserve power system that does not vent hazardous or corrosive gases into the atmosphere.

g. The AVN must, upon restoration of main AC power after total depletion of the reserve power supply, ensure that the reserve power system is recharged at a sufficient rate such that it is available for full service (i.e., 20 minutes of reserve power) within 2 hours.

h. The AVN must, upon restoration of main AC power after total depletion of the reserve power supply, restart automatically without requiring any operator intervention (e.g., to activate power switch, load software, or reset processors).

i. The AVN must, while main AC power is provided within tolerances of the NVS to Power IRD, ensure that operations are not degraded while the reserve power is partially discharged, fully discharged, or without batteries.

j. The AVN must provide a reserve power system that is equipped with an emergency battery disconnect mechanism.

k. The AVN must provide a battery disconnect mechanism that permits authorized personnel to activate a protected switch in the equipment room to disconnect batteries from the reserve power supply, regardless if AC mains power is or is not present.

l. The AVN must provide batteries that meet the requirements in FAA-G-2100h paragraph 3.3.1.4.1.

3.5.1.1.4 Battery Monitor

a. The AVN must provide a battery monitor system for AVNs equipped with Reserve Power batteries.

b. The AVN must provide a battery monitor system that monitors the health conditions of individual batteries.

c. The AVN must provide a battery monitor system that displays health conditions of individual batteries.

d. The AVN must provide a battery monitor system that stores all health conditions of individual batteries for up to 5 years.

e. The AVN must provide a battery monitor system that monitors the voltage level of individual batteries.

f. The AVN must provide a battery monitor system that determines voltage level of individual batteries to a 50mV resolution.

g. The AVN must provide a battery monitor system that determines the existence of battery shorts conditions.

h. The AVN must provide a battery monitor system that determines the existence of open circuits between battery terminals.

i. The AVN must provide a battery monitor system that determines the existence of battery undercharge conditions.

j. The NVS must provide a battery monitor system that determines the existence of battery overcharge conditions.

k. The AVN must provide a battery monitor system that monitors the temperature of individual batteries.

l. The AVN must provide a battery monitor system that performs load checks of individual batteries.

m. The AVN must provide a battery monitor system that performs load checks of individual batteries without manual disconnection of batteries from the system.

n. The AVN must, for multiple bank battery backup system, provide a battery monitor system that isolates batteries from the power reserve system, when performing load checks.

o. The AVN must provide a battery monitor system that allows authorized users to determine duration of load check.

p. The AVN must provide a battery monitor system that allows authorized users to perform load checks at any time.

q. The AVN must provide a battery monitory system that inhibits battery load checks to be performed when the AVN is operating on reserve power.

r. The AVN must provide a battery monitor system that allows authorized users to schedule automatic load checks of individual batteries for up to 1 year in advance to the year, month, day, hour, and minute.

s. The AVN must provide a battery monitor system that provides alerts of automatically scheduled load checks 24 hours in advance, 4 hours in advance, 1 hour in advance, and 15 minutes in advance.

t. The AVN must provide a battery monitor system that allows automatically scheduled load checks to be terminated at any time.

u. The AVN must provide a battery monitor system that allows load check duration from 5 minutes to 8 hours in 1 minute increments.

v. The AVN must provide a battery monitor system that stores voltage vs. time discharge data for individual batteries.

w. The AVN must provide a battery monitor system that reports discharge time in a graphical format.

x. The AVN must provide a battery monitor system that extrapolates load check data to full system load performance.

y. The AVN must provide a battery monitor system that stores results of load test data for individual batteries.

z. The AVN must provide a battery monitor system that stores up to 60 load test results for individual batteries.

aa. The AVN must provide a battery monitor system that determines trend of individual batteries using load test results.

bb. The AVN must provide a battery monitor system that predicts battery replacement time in day, month, year format.

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cc. The AVN must provide a battery monitor that allows authorized users to determine battery replacement time as a function of capacity depletion (%) of individual batteries.

dd. The AVN must provide a battery monitor system that permits authorized users to uniquely identify individual batteries by number, name, location, and installation date, and recommended replacement date.

ee. The AVN must provide a battery monitor system that permits authorized users to export all data using Microsoft Office tools.

ff. The AVN must provide a battery monitor system that upon failure there is no operational impact on the ability to switch onto the battery backup power.

3.5.1.1.5 Grounding Systems

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a. The NVS must provide a grounding system that prevent cross-coupling through the ground system.

b. The NVS must use centrally located grounding to prevent ground loops and shared impedance-coupling paths.

c. The NVS must use separate grounding networks as necessary for the ac power ground.

d. The NVS must use separate grounding networks as necessary for the chassis ground.

e. The NVS must use separate grounding networks as necessary for the signal ground.

f. The NVS must use separate grounding networks as necessary for the trunk circuit ground.

g. The NVS must provide grounding networks that are terminated on a grounding terminal block for either strap connection and/or further connection to the earth, ac, and signal grounds.

h. The NVS must provide grounding in accordance with 4.3.4 of FAA-STD-019e.

3.5.1.1.6 Surge Protection

a. The NVS must provide transient protection for all signal, data, and control lines; both at facility entrance and at entrance to all electronic equipment in accordance with 4.2.11.5 and 4.3.2 of FAA-STD-019e.

3.5.1.1.7 Inrush Current

a. The NVS must ensure that the peak inrush current during startup does not exceed three times the normal peak operating current.

b. The NVS must ensure that the duration of the inrush operating current does not exceed 350 milliseconds.

3.5.1.2 Mechanical Requirements

3.5.1.2.1 Module Removal and Insertion

a. The NVS must permit removal of all modules and printed circuit assemblies without causing damage to the modules, printed circuit assemblies, or any other equipment.

b. The NVS must permit the removal or insertion of each module while system power is on without damage to equipment or interruption of service to the operator on remaining modules.

c. The NVS must ensure that all modules are plug-in type modules where practicable and have positive locking mechanisms to prevent loosening.

d. The NVS must use mechanical means (interlocks or keys) to prevent insertion or connection of plug-in modules that are incorrectly oriented.

e. The NVS must ensure that plug-in modules are standardized to permit interchangeability of like modules without alignment or adjustment.

f. The NVS must avoid the splitting of a single function across more than one module.

g. The NVS must use equipment that is designed to use modular construction.

h. The NVS must, to the extent that software or firmware changes are required to repair an LRU, ensure that operations are only affected on the LRU being repaired.

i. The NVS must be able to return a single LRU to service without requiring a system restart.

j. The NVS must ensure the each LRU complies with weight and size limits specified in paragraph 4.2.2 of HF-STD-001 for repair or replacement of that LRU by one person.

3.5.1.2.2 Printed Circuit Assemblies

a. The NVS must ensure that terminology and definitions are in accordance with ANSI IPC-T-50.

b. The NVS must ensure that alignment, where required, is possible using standard tools.

c. The NVS must ensure that alignment adjustments mechanisms are accessible without disassembly of the printed circuit assembly.

d. The NVS must ensure that printed circuit assemblies are manufactured in accordance with paragraph 3.2.2.1 of FAA-G-2100h.

e. The NVS printed circuit assemblies must conform to the requirements of IPC-2221A.

f. The NVS must prohibit wire wrap on all printed circuit boards.

3.5.1.2.3 Cabinet and Frame Requirements

3.5.1.2.3.1 Cabinet and Frame Construction

a. The NVS must ensure that equipment room cabinets and frames do not exceed a height of 86 inches (2.18 meters), a width of 36 inches (0.91 meters), and a depth of 34 inches (0.86 meters).

b. The NVS must, where equipment needs to pass through a man-door size opening for installation, provide equipment room cabinets and frames

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having dimensions not to exceed 72 inches (1.83 meters) tall by 36 inches (0.91 meters) wide by 30.5 inches (0.76 meters) deep.

c. The NVS must ensure that the loading conditions of each fully equipped cabinet and frame does not exceed an average weight distribution greater than 125 lb/ft2.

d. The NVS must ensure that the structural strength and rigidity of the cabinets, frames, and consoles are such that normal handling in loading, shipping, unloading, and setting into position for installation will not result in any damage to the equipment.

e. The NVS must ensure that he removal of equipment or modules or interchanging of equipment modules does not cause any deformation to the cabinets and frames.

f. The NVS must ensure that the structural strength and rigidity of all cabinets are independent of any strength or rigidity provided by access doors.

g. The NVS must ensure that removable components do not exceed the weight limits specified in HF-STD-0001 paragraph 4.2.2 for male and female maintainers.

3.5.1.2.3.2 Cabinet and Frame Prewiring

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a. The NVS must ensure that all cabinet wiring is provided with chafing protection in addition to the individual wire or cable insulation jackets.

3.5.1.2.3.3 Cabinet and Frame Convenience Outlets

a. The NVS must provide at least two ac convenience outlets for each cabinet or frame (i.e., for use by technicians to power tools, test equipment, etc. during maintenance operations).

b. The NVS must ensure that the ac convenience outlets are independent of the primary power source for the equipment within the cabinets and frames, and in accordance with 3.1.1.1.1.f in FAA-G-2100h

3.5.1.2.3.4 Cable Entrance and Exit

a. The NVS must provide access for interconnecting cables to enter through the top and bottom of the equipment cabinet.

b. The NVS must allow direct cabling through the side walls of cabinets, at least 6 inches above the floor, within a subsystem where distance is considered a critical factor in circuit performance.

c. The NVS must ensure that the use of direct cabling does not preclude the installation of additional frames, card cages, or other such items that may be required for future expansion.

3.5.1.2.3.5 Distribution Panels

a. The NVS must provide a distribution panel to facilitate the interconnection of all cables to the government equipment distribution frame(s).

b. The NVS must provide a distribution panel that accommodates all interface requirements.

c. The NVS must provide cables to interconnect the distribution panel to the government equipment distribution frame(s), panels, or junction boxes.

d. The NVS must provide distribution panels that accommodates the wired for capacity of the basic system ordered for the site.

e. The NVS must provide surge protector frames as required by FAA-STD-019e.

3.5.1.2.3.6 Ventilation and Cooling

a. The NVS must ensure that each cabinet requiring forced ventilation contains its own silent fan blower system that requires no external ducts.

b. The NVS must ensure that equipment does not malfunction with access doors and plates open, and drawers extended for servicing, for up to 8 consecutive hours.

c. The NVS must take in air from the bottom of the cabinet.

d. The NVS must permit cabinet air intake from either below a raised floor or from floor level, by simple removal of cover plates or baffles.

e. The NVS must, for each cabinet requiring external forced air ventilation, provide uniform air filters that are replaceable using only common hand tools.

f. The NVS must ensure that ventilation exhaust openings are through the top of the cabinet.

g. The NVS must direct the exhaust upward and away from personnel and other equipment.

h. The NVS must ensure that the exhaust outlet openings do not interfere with or be obstructed by cable routing.

i. The NVS must, for position equipment where fans are incorporated into the design, ensure that the position provides an indication of the failure of the fan module.

j. The NVS must, for each cabinet requiring forced ventilation, report to the maintenance function any condition that would cause a ventilation problem (e.g., blower failure, clogged filters).

3.5.1.2.3.7 Overheat Warning

a. The NVS must provide warning devices in each separate cabinet to indicate when the temperature exceeds the maximum safe operating temperature for the equipment within the cabinet.

b. The NVS must provide a visual indication of overheating for each cabinet, readily visible from the front cabinet exterior.

c. The NVS must provide an alarm to the maintenance function whenever cabinets overheat.

3.5.1.2.4 Interconnection Cables

a. The NVS must provide interconnection cables and connectors required for factory testing, equipment site installation, checkout, acceptance testing, cutover, operation, and maintenance that are compatible with both under floor and overhead distribution and cable facilities provided by the government.

b. The NVS must ensure that all such cabling permit accessibility to equipment for test maintenance and replacement.

c. The NVS must provide all cabling from NVS equipment to the Government provided IDF.

d. The NVS must provide a NVS IDF that provides blocks that allow incoming cables to be terminated on quick-connect terminals.

e. The NVS must ensure that all NVS IDF blocks have quick-connect terminals that allow both equipment and cross-connect wires to be terminated.

f. The NVS must ensure that the NVS IDF accommodates at least 25% more connections than required for the capacity specified for each site.

g. The NVS must provide all cables, cross-connects, and any additional cable trays needed between the following entities: NVS back room equipment and position equipment; NVS and the Contractor provided IDF; Contractor provided IDF and the FAA provided VDF/RI IDF; Contractor provided IDF and the FAA provided MDS; Contractor provided IDF and the transition switch.

h. The NVS must provide a distribution frame (IDF) to facilitate the interconnection of all NVS cables to the FAA provided NVS Distribution Frame and Radio Interface Intermediate Distribution Frame (VDF/RI IDF) system and the FAA provided Master Demarcation System (MDS) Frame system.

i. The NVS must provide an IDF that accommodates all NVS interface requirements including the existing equipment-to NVS transition switch.

j. The NVS must comply with FAA Order 6470.33A for all cable installations, except the power/signal cable spacing specified by paragraph 11c where facility space availability will govern the application of paragraph 11c.

k. The NVS must comply with 3.3.1.4.10 of FAA-G-2100h; National Electric Code, NFPA-70; and FAA-C-1217F for cabling and wiring.

l. The NVS must provide cable labels with mechanically produced labels (i.e., not hand written) at both end points of the cable, uniquely identifying their point of origin (i.e., the connector identifier and distribution point) and the signals being conducted on the cable.

m. The NVS must supply plenum-rated interconnecting cables in accordance with NFPA-70 articles 300-22 (c) and 800-53.

3.5.1.2.4.1 <u>Cable Connectors</u>

a. The NVS must ensure that all cable connectors furnished on the equipment for making external connections are clearly identified on the plug-in side by labels descriptive of their specific function and by the proper reference designation.

b. The NVS must ensure that cable connectors are mechanically keyed to prevent incorrect installation and hookup.

c. The NVS must ensure the mating connector part (connector or plug) that is electrically energized contain female contacts.

d. The NVS must ensure that all cable connectors are mechanically retained in place.

3.5.1.2.4.2 <u>Cable-End Terminations</u>

a. The NVS must ensure that signal cable end terminations are solder less, quick-disconnect terminal blocks or mass termination connectors. Connectors that have insert-type contacts may be loaded with only the contacts actually used, plus spares.

b. The NVS must provide power cable terminations that are screw-type terminal blocks, pressure contact terminal blocks, or locking connectors.

3.5.1.2.4.3 <u>Power Cables</u>

a. The NVS must ensure that all ac power cables and wiring within the NVS are isolated from sensitive voice and signaling circuits.

b. The NVS cabling must include all junction boxes, fittings, and distribution equipment (switches and circuit breakers from government power source to the NVS primary power panel).

3.5.1.2.5 Nameplates and Product Marking

a. The NVS must ensure that the identification of NVS units are in accordance with 3.3.3.1 of FAA-G-2100h.

3.5.1.2.6 Materials

a. The NVS must ensure that no material used on or in the NVS contains asbestos, polychlorinated biphenyls (PCBs), lead paint, or Class 1 ozone-depleting substances.

b. The NVS must ensure that the selection of materials is consistent with economically producing a system that performs its specified functions with ruggedness and durability.

3.5.1.2.6.1 Recycled Material

a. The NVS must ensure that all electrical, electronic, or electromechanical parts used in the NVS are new.

b. The NVS must permit recycled metals or plastic to be used for mechanical or structural parts as appropriate.

3.5.1.2.6.2 Toxicity

a. The NVS must be constructed from materials of low toxicity, not having dangerous gasses due to fires or toxic effects when used under specified environmental conditions for operating and non-operating equipment contained within this specification.

3.5.1.2.6.3 Glass

a. The NVS must ensure that all glass used in the equipment is shatterproof, clear, and free of distortion at all viewing angles.

3.5.1.2.6.4 Fungus

a. The NVS must ensure that the materials chosen are non-nutrient to fungus and insects, flame resistant, non-hygroscopic, and not adversely affected by the environmental conditions specified herein.

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3.5.1.2.6.5 Plastics

a. The NVS must ensure that transparent plastics used in displays, selectors, backlighting, and related applications do not warp, soften, discolor, or otherwise be degraded in appearance or physical properties due to heat buildup encountered in normal operation.

3.5.1.2.7 Color and Finishes

a. The NVS must provide all equipment racks and cabinets that are fully painted on all exterior surfaces and corrosion protected on all interior surfaces (painting permitted).

b. The NVS must ensure that all surfaces are prime painted in a neutral color.

c. The NVS must ensure that the finish is a baked enamel paint or equivalent.

d. The NVS must ensure that all exterior surfaces are free from burrs and sharp edges.

3.5.1.2.8 Materials, Processes, and Parts

3.5.1.2.8.1 Dissimilar Metals

a. The NVS must ensure that dissimilar metals are not used where they will degrade or cause deterioration to the assembled parts.

b. The NVS must, when dissimilar metals are used, ensure that they are coated or protected to inhibit or prevent degradation to other parts and assemblies.

3.5.1.3 Electronic Equipment Assembly Requirements

a. The NVS must assemble electronic equipment in accordance with 3.2.2.1 of FAA-G-2100h.

3.5.1.4 Government-Furnished Property Usage

a. The NVS must only require the use of government-furnished property as indicated in this specification.

3.5.1.5 Safety

a. The NVS must comply with Occupational Safety and Health Administration (OSHA) safety requirements defined in FAA-G-2100H, paragraph 3.3.5.

b. The NVS must apply system safety engineering principles in accordance with 3.3.5 of FAA-G-2100G.

c. The NVS must comply with the personnel safety requirements of Executive Order 12196 Occupational Safety and Health Program for Federal Employees.

d. The NVS must comply with the personnel safety requirements of Code of Federal Regulations (CFR) Title 29 Part 1910, Occupational Safety and Health Standards.

e. The NVS must apply system safety engineering principles throughout the design, development, manufacture, test, checkout, operation, and maintenance of the NVS in accordance with the following requirements of MIL-HDBK-454, Guideline 1: Safety Design Criteria - Personnel Hazards, Guideline 3: Flammability Guideline 8: Electrical Overload Protection, and Guideline 45: Corona and Electrical Breakdown Prevention.

f. The NVS must comply with the personnel safety requirements of 29 CFR 1926, Occupational Safety and Health Administration, Labor.

g. The NVS must comply with the personnel safety requirements of FAA Order 3900.19B Occupational Safety and Health Program.

h. The NVS must comply with the personnel safety requirements of the National Fire Protection Association Standard 70 (NFPA 70), National Electrical Code.

i. The NVS must comply with provisions of Chapters 12 & 13 of FAA Human Factors Design Standard (HFDS) requirements for Personnel Safety and Environment.

j. The NVS must electrically isolate any batteries associated with Reserve Power by isolating battery grounds from chassis ground.

k. The NVS must provide a means to electrically isolate any batteries associated with Reserve Power by providing over current protection.

l. The NVS must ensure that the battery isolating mechanism is located and protected to prevent accidental activation.

3.5.1.5.1 Hazardous Materials

a. The NVS must be free of asbestos, polychlorinated biphenyls (PCBs), lead, and class one ozone-depleting substances, with the exception of mercury that may be present in the liquid crystal display (LCD) of computer monitors with quantities not to exceed 60 milligrams and lead that is used in the manufacture of computer circuit boards and monitors.

b. The NVS must minimize the production of hazardous waste as defined in FAA-G-2100G, paragraph 3.3.5.6.

c. The NVS must limit personnel exposure to hazardous materials to levels permitted by CFR Title 29 Part 1910, Subpart Z - Toxic and Hazardous Substances.

d. The NVS must ensure that the disposal of hazardous materials is in accordance with the Resource Conservation and Recovery Act, and FAA Order 4800.2, Utilization and Disposal of Excess and Surplus Personal Property.

e. NVS components must be delivered free of asbestos, polychlorinated biphenyls (PCBs), lead paint, and Class I ozone-depleting substances in accordance with FAA Order 1050.20, Airway Facilities Asbestos Control Program; FAA Order 1050.14, Polychlorinated Biphenyls (PCBs) in the National Airspace System; FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts; and FAA Order 1050.10, Prevention, Control, and Abatement of Environmental Pollution at FAA Facilities.

f. The NVS must ensure that the use of hazardous materials in the design, manufacture, and installation of the NVS complies with 29 CFR 1910 Occupational Safety and Health Standards.

g. The NVS must ensure that the handling of hazardous materials is in accordance with 29 CFR 1910, Occupational Safety and Health Standards; FAA Order 8040.4, Safety Risk Management; and 29 CFR 1910.1000, Air Contaminants.

h. The NVS must ensure that components containing potentially hazardous materials to employees are identified per 29 CFR 1910.1200 Hazard Communications.

i. The NVS must ensure that reserve power supplies do not vent hazardous or corrosive gases into the atmosphere.

3.5.1.6 Environmental Endurance

3.5.1.6.1 AVN Environmental Conditions

a. The AVN must be designed for all combinations of environmental conditions as shown in TABLE 3-17.

b. The AVN must exhibit a design margin range of 0°C to +50°C to be included for the operating condition.

c. The AVN must, when subject to the non-operating conditions, return to operation without degradation of performance.

TABLE 3-17. AVN Environmental Conditions

Condition	Ambient Temperature Degrees Centigrade, (Degrees Fahrenheit)	Relative Humidity % RH	Altitude, ft (m)
Operating *	+10 to +40 (+50 to +104)	10 to 80 non-condensing	0 to 10,000 (0 to 3,048)
Non-operating	-40 to +70 (-40 to +158)	0 to 100 non-condensing	0 to 35,000 (0 to 10,000)
*The condition is the range within which the facility air conditioning system is permitted to operate. It, therefore, represents the allowable operating heat sink condition to which the NVS must dissipate the waste heat.			

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3.5.1.6.2 RRN Environmental Conditions

a. The RRN must be designed for all combinations of environmental conditions as shown in TABLE 3-18.

b. The RRN must, when subject to the non-operating conditions, return to operation without degradation of performance.

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TABLE 3-18. RRN Environmental Conditions

Condition	Ambient Temperature Degrees Centigrade, (Degrees Fahrenheit)	Relative Humidity % RH	Altitude, ft (m)
Operating	0 to +40 (+32 to +104)	5 to 95 non-condensing	0 to 12,000 (0 to 3,048)
Non-operating	-40 to +70 (-40 to +158)	0 to 100 Non-condensing	0 to 35,000 (0 to 10,000)

3.5.1.7 Solar Radiation

a. The NVS must ensure that exposure to solar radiation in the tower cab does not cause degradation of appearance.

b. The NVS must ensure that exposure to solar radiation in the tower cab does not cause failure of NVS to meet all functional and performance requirements.

3.5.1.8 Electromagnetic Compatibility

a. The NVS must deliver no system under this specification that causes electromagnetic interference with, or be affected by electromagnetic interference from, the site at which it is installed.

b. The NVS must ensure that all equipment is compliant with Class B digital devices per CFR 47, Chapter 15.

c. The NVS must ensure that equipment meets the MIL-STD-461 requirements and those listed in TABLE 3-19.

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TABLE 3-19. Electromagnetic Compatibility Requirements

Detailed Requirements
CE102, conducted emissions, power leads, 10 kHz to 10 MHz
CS101, conducted susceptibility, power leads, 30 Hz to 150 kHz
CS114, conducted susceptibility, bulk cable injection, 10 kHz to 400 MHz
CS115, conducted susceptibility, bulk cable injection, impulse excitation
CS116, conducted susceptibility, damped sinusoid transients, cables and power leads, 10 kHz to 100 MHz
RE102, radiated emissions, electric field, 10 kHz to 18 GHz
RS101, Radiated Susceptibility, magnetic field, 30 Hz to 100kHz
RS103, radiated susceptibility, electric field, 10 kHz to 40 GHz

3.5.1.9 FCC Registration

a. The NVS must provide the capability of interfacing with common carrier facilities.

3.5.1.10 Power Line EMI Reduction Requirements

a. The NVS must use EMI power line filters whenever necessary to eliminate power line-conducted emissions, in accordance with MIL-STD-461.

b. The NVS must ensure that all interconnections between the NVS and external systems are shielded in accordance with Section 4.1.2 of FAA-STD-019e.

c. The NVS must place emphasis on equipment interconnection design and layout to reduce undesirable equipment interactions.

3.5.1.11 Electrostatic Discharge Immunity

a. The NVS must incorporate protection against damage arising from electrostatic discharge from personnel using the NVS.

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b. The NVS must incorporate protection against damage arising from electrostatic discharge from personnel servicing the NVS.

c. The NVS must sustain no equipment malfunctions at severity level 1 as specified in TABLE 3-20 when subjected to ESD pulses having the waveform in FIGURE 3-14 and the maximum current and voltage limits specified under Level 1 in TABLE 3-20

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d. The NVS must sustain no equipment malfunctions at severity level 2 as specified in TABLE 3-20 when subjected to ESD pulses having the waveform in FIGURE 3-14 and the maximum current and voltage limits specified under level 2 in TABLE 3-20.

e. The NVS ESD testing must be performed on a fully operational NVS handling the communications test load described in TABLE 3-6 and TABLE 3-7.

f. The NVS ESD test generator must simulate the human body contact model defined in paragraph 6 of IEC-61000-4-2.

g. The NVS must use a direct-injection test method for testing NVS equipment, with the air discharge method available as an additional method for insulated devices as defined in IEC-61000-4-2.

h. The NVS must use IEC-61000-4-2 as guidelines for test simulators, test method selection, test point selection, and the number of test trials.

TABLE 3-20. Electrostatic Discharge Failure Criteria

Severity Level	Effect
0	Temporary disturbances with no lasting effects, such as an audible click or flicker on a video screen.
1	All functions perform as designed during exposure, but one or more may go beyond specification tolerance (e.g., call setup delay). All functions return automatically to within normal limits.
2	One or more functions do not perform as specified during the exposure, but system returns automatically to normal after exposure is removed.
3	Indicated as machine error to user and must be corrected by manual retry or system restart (e.g., processor locks up); Loss of calls in progress, but system returns to idle state.
4	Critical non-recoverable error, loss or corruption of stored data, operational safety is affected, power cycling necessary to restore service, equipment damage requiring repair or replacement.

TABLE 3-21. Voltage and Current limits for electrostatic discharge testing

Level	Simulator voltage, kV		Discharge current, A		
	Direct injector	Air discharge	IPeak[a]	I30[b]	I60[b]
1	6	15	22.5	12.0	**6**
2	8	20	30.0	16.0	**8**
a. Within ± 10% b. Within ± 30%					

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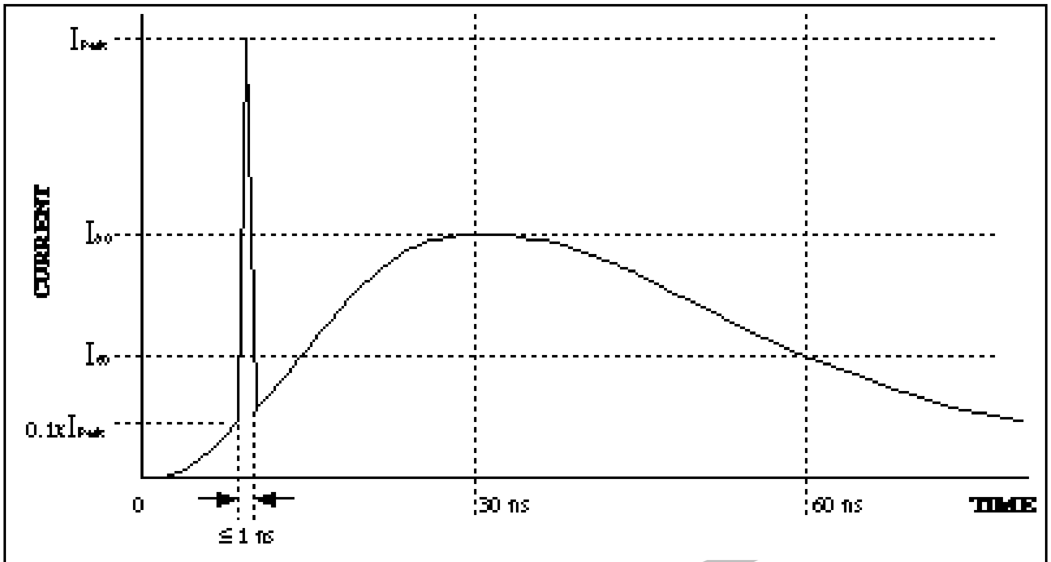

FIGURE 3-14. Electrostatic Discharge Test Waveform

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3.5.1.12 <u>Vibration and Shock</u>

a. The NVS must suffer no harmed when exposed to the random vibration environment given in TABLE 3-22 and TABLE 3-23.

b. The NVS must ensure that for shipment, proper packaging techniques are implemented to prevent damage from transportation vibration and shock.

c. The NVS must ensure that for unpackaged bench handling, the hardware can withstand a 4-inch pivotal drop and a 1-inch (free) drop from any probable direction.

TABLE 3-22. Random Vibration Exposure for NVS

Frequency, Hz	Level
20-1000	0.02 G2/Hz
1000-2000	-6 dB/octave
Overall	5.5 G rms

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TABLE 3-23. Random Vibration Exposures for Position Equipment

Frequency, Hz	Level
20-1000	0.006 G2/Hz
1000-2000	-6 dB/octave
Overall	3.0 G rms
The random vibration is assumed in each of the three mutually orthogonal axes at the mounting of the assembly. (VS4995)	

3.5.2 System Size and Capacity

3.5.2.1 System Capacity

a. The AVN hardware configuration must be scalable based on the number of positions required.

b. The AVN hardware configuration must be scalable based on the number of A/G interfaces required.

c. The AVN hardware configuration must be scalable based on the number of G/G interfaces required.

d. The AVN hardware configuration must be scalable based on the number of external voice network interfaces required.

e. The NVS hardware configuration must be scalable based on the number of workstations required.

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f. The NVS hardware configuration must be scalable based on the number of remote alarm interfaces required.

3.5.2.1.1 Number of Positions

a. The AVN must be configurable from one position up to the maximum number of positions supported.

b. The AVN must support at least 800 operational positions.

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3.5.2.1.2 Position Equipment Capacity

a. The AVN must provide operational position equipment that provides access to at least 100 A/G frequencies (1 frequency = 1 main/standby pair) in any configuration.

b. The AVN must provide operational position equipment that provides access to at least 200 DAs selectors in any configuration.

3.5.2.1.3 External Interfaces

3.5.2.1.3.1 A/G Interfaces

a. The AVN must be configurable with one A/G frequency up to the maximum number of frequencies supported.

b. The AVN must support at least 800 frequencies.

c. The AVN must permit each frequency interface to support receive only with single (main) receiver.

d. The AVN must permit each frequency interface to support receive-only with main and standby receivers, requiring main/standby transfer capability.

e. The AVN must permit each frequency interface to support transmit and receive with a single (main) transmitter and receiver.

f. The AVN must permit each frequency interface to support transmit and receive with main and standby transmitters and receivers (requiring main/standby transfer capability.

g. The AVN S must accommodate paired frequencies, in which UHF and VHF equipment are operated from the same control circuits and audio lines.

3.5.2.1.3.2 G/G Circuits and Trunks

a. The AVN must be configurable with one G/G circuit up to the maximum number of G/G circuits supported.

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b. The AVN must support at least 800 individual G/G circuits.

3.5.2.1.3.3 Workstations

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a. The AVN must be configurable from two workstations up to the maximum number of workstations supported.

b. The AVN must support at least 72 workstations.

c. The AVN must provide desktop workstations as identified by the government at the time of order.

d. The AVN must provide rack-mountable workstations as identified by the government at the time of order.

3.5.2.1.3.4 Workstation Printers

a. The AVN must provide at least 4 networkable system printers for use by workstations, as ordered by the government.

b. The AVN must provide printers that support local connectivity via USB interface.

3.5.2.1.3.5 Remote Alarm Panel

a. The AVN must provide up to at least two remote alarm panels as ordered by the government.

3.5.2.2 Installation Space Requirements

3.5.2.2.1 Operational Position Equipment

a. The AVN position equipment must, except in the case of remote position equipment, be powered from the central equipment; the government will make no power available in the tower cab or approach control area for individual position equipment.

b. The AVN must provide at each position a protected power disconnect switch accessible by trained maintenance personnel to power down the position.

c. The AVN must provide TRACON position equipment that is rack-mountable with the rest of the system central equipment, as ordered by the government.

3.5.2.2.2 Supervisory Position

a. The NVS must require no more than an area of 3 feet by 3 feet (desk top) for workstations/system terminals required for the supervisory position. The space required to support the ATC communication suit is additional.

3.5.2.2.3 Maintenance Position

a. The NVS must require no more than an area of 3 feet by 3 feet (desk top) for workstations/system terminals required for the maintenance position.

b. The NVS must, as ordered by the government, provide workstations/system terminals that are rack-mountable with the rest of the system central equipment.

c. The NVS must ensure that other equipment required by the maintenance position (e.g., test point access, duplicate position equipment, indicators, power supply monitoring and service points, etc.), fit within the space allocated.

3.5.2.2.4 Remote Terminals

b. The NVS remote maintenance terminal must fit within a 3 by 3 foot area of desktop space. This space is in addition to the space to be made available for operational position equipment for maintenance communications,.

3.5.2.2.5 Central Equipment Floor Space

a. The AVN central equipment must include all equipment necessary to support NVS operations except for operational positions and supervisory and maintenance workstation.

b. The AVN central equipment must fit within the floor space allocations by system size of TABLE 3-24, including aisle space and space for equipment access.

TABLE 3-24. System Central Equipment Floor Space Allocations

TBD			

3.5.2.2.6 Separation of Equipment

a. The AVN must permit operational position equipment and workstations/system terminals to be located up to 1000 cable feet away from the central equipment.

b. The AVN must, as ordered by the government, provide operational positions that can be remoted as much as 10,000 cable feet away from the central equipment.

c. The AVN must, as ordered by the government, provide workstations/system terminals that can be remoted as much as 10,000 cable feet away from the central equipment.

3.5.3 Human Factors

The purpose of Human Factors efforts in NVS design is to ensure a system which optimizes human performance, reduces human error, increases the safety of the NAS, and enhances user satisfaction.

a. The NVS must ensure that the overall Human Factors effort is in accordance with FAA Order 9550.8, Human Factors Policy, Paragraph 8, Policy, and Paragraph 9, Objectives.

b. The NVS must ensure that the overall process of integrating Human Factors considerations into the design and development of the NVS is in accordance with FAA HF-STD-004, Standard Practice: Requirements for a Human Factors Program.

c. The NVS must ensure that the overall design of the NVS is in accordance with FAA HF-STD-001, Human Factors Design Standard for Acquisition of Commercial-Off-The-Shelf Subsystems, Non-Developmental Items, and Developmental Systems, DOT/FAA/CT-03/05, Chapter 2, General Design Requirements.

3.5.3.1 NVS Controls and Visual Indicators

3.5.3.1.1 General

a. The NVS must ensure that the design of controls and visual indicators is in accordance with the following sections of HF-STD-001, Chapter 6 as shown in TABLE 3-25, Controls and Visual Indicators, and all of Chapter 9, Input Devices.

b. The NVS must suffer no detrimental effects, nor cause any such effects on operational communications, should operators attempt to activate unassigned selections or activate more than one selector simultaneously.

TABLE 3-25. HF-STD-001, Chapter 6 Applicable Sections

	Section	Title
1	6.1.1	General Control Information
2	6.1.2	Labeling and Marking Controls
3	6.1.5	Hand Operated Controls
4	6.2.1	General Visual Indicator Information
5	6.2.2	Trans illuminated Displays
6	6.2.3	Dot Matrix and Segmented Displays
7	6.2.4	Light Emitting Diodes
8	6.3	Visual Indicator - Control Integration

3.5.3.1.2 Touch Entry Display (TED)

This section specifically applies to the design of the ATC-position interface and not to the maintenance/supervisory workstations.

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3.5.3.1.2.1 Physical Characteristics of AVN TEDs

a. The AVN must minimize parallax between the touch detection plane and the display device screen of the TED.

b. The AVN must ensure that the mounting approach minimizes parallax between the touch detection plane and the display device screen of the TED.

c. The AVN must have a non-glare touch surface on the TED.

d. The AVN must have a non-abrasive touch surface on the TED.

e. The AVN must have a touch surface on the TED that allows a minimum of 60% light transmission.

f. The AVN must have a touch surface on the TED that is impervious and scratch-resistant to fingernails, pens, pencils, or any other object used for touch activation.

g. The AVN must have a touch surface on the TED that permits cleaning with, and not be affected by, commercially available non-abrasive cleaning compounds.

3.5.3.1.2.2 Activation of TEDs

a. The AVN must provide TEDs that respond to touch action by fingers or inert pointers (e.g., pencils) having a diameter of from 0.25 to 1.0 inches, and must resolve the coordinates of the touch to the zone (i.e., "button") containing the greatest percentage of the touched area.

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b. The AVN must provide TEDs that detect and resolve simultaneous touches in two or more zones.

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c. The AVN must provide an error indication when simultaneous inputs (touches)to the TED are detected.

d. The AVN must provide TEDs that detect and resolve motion in multiple touch areas (i.e., "touch and drag"), such that the first key pressed is the only key activated if the user's finger is dragged out of the initial touch area before lifting off the touch surface.

e. The AVN must provide an assumed touch point within 1/16 inches of the centroid of the touched area.

f. The AVN must permit momentary touch to provide latching pushbutton equivalency.

g. The AVN must permit a continuous touch to provide non-latching pushbutton equivalency.

h. The AVN must ensure that TED zones provide positive visual indication of response to touch, using reverse video, color changes, intensity changes, or similar techniques.

i. The AVN must provide visual feedback to the position operator of valid touch detection, and of the display control area affected

j. The AVN must provide an operator-selectable (on/off) keyclick, indicating valid touch to the position operator's HS.

k. The AVN must permit the volume of the keyclick to be adjustable at the position.

l. The AVN must permit the keyclick volume control and headset volume control to be coupled in such a way that the keyclick volume remains discernibly below the headset volume when the headset volume is adjusted up or down.

m. The AVN must ensure the keyclick indication provided at a position is not transmitted over any A/G or G/G communications emanating from the position

n. The AVN must provide feedback indicating an invalid touch for touches to touched areas where no NVS function or feature is invoked.

o. The AVN must, where visual or audible indications are not otherwise specified, provide the operator with messages, color changes, shape changes, brightness or intensity level changes, or other distinct indications confirming a requested system action, or indications that the action was not performed.

p. The AVN must, when the TED displays multiple screens or pages of controls and displays, manage these screens or pages such that the most important

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features (e.g., incoming call indications) and most frequently used features are available immediately whenever required by the operator.

3.5.3.1.2.3 Detection and Response Times

a. Reserved.

3.5.3.1.2.4 Operational Sequence Timeout

b. The AVN must provide a programmable, system-level operational sequence timeout interval not to exceed 30 seconds in length.

c. The AVN must, unless otherwise specified in this specification, invoke the system level timeout interval when operational sequences requiring two or more touches are not completed by the position operator.

d. The AVN must, when the system level timeout interval has elapsed, effect a cancellation of the operational sequence initiated.

e. The AVN must notify the position operator when the cancellation of the operational sequence has occurred.

3.5.3.2 NVS Displays

3.5.3.2.1 General

The NVS must ensure that the design of displays is in accordance with the following sections of HF-STD-001, Chapter 5, Displays and Printers, and Chapter 8, Computer Human Interface as shown in TABLE 3-26.

TABLE 3-26. HF-STD-001, Chapter 5 Applicable Sections

	Section	Title
1	5.1	Displays
2	5.2	Cathode Ray Tube Displays
3	5.3	Flat-Panel Displays
4	5.4	Liquid Crystal Displays
5	5.5	Gas Plasma Displays
6	5.6	Electroluminescent Displays
7	5.9	Printers
8	8.6	Coding

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a. The NVS must ensure all displays have a contrast ratio of 8:1 or greater.

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3.5.3.2.2 Readability

b. The AVN must provide displays that are readable in conditions ranging from total darkness up to full daylight levels (2000 foot-lambert glare source).

c. The AVN must ensure that information displayed associated with selectors (e.g., labels on DA selectors) is readable regardless of the state of the associated selectors.

3.5.3.2.3 Information Content of Displays

a. The NVS must limit the display of information to that which is pertinent to the operator's job (i.e., information called for in the functional requirements of this specification).

b. The NVS must display information in the form most immediately useful to operators (i.e., without requiring transposition, computation, interpolation, or conversion of data, or the lookup of additional data).

c. The NVS must avoid redundancy in the display of information to operators.

d. The NVS must ensure that all selector displays (DAs, frequency selectors) are consistent in appearance with regard to identifying whether their associated functions are active or not.

3.5.3.2.4 Brightness Balance of Displays

a. The NVS must, for individual self-illuminated display components under normal operation, provide the same general level of brightness, except as adjusted by the operator.

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b. The NVS must permit the brightness of the display device to be adjusted across its range of brightness, with a minimum of 20 discrete steps; where the brightness ratio between any two adjacent steps is a constant, or continuously along an exponential curve connecting such discrete points.

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c. The NVS must permit the position operator, as controlled by position classmark, to adjust the brightness of the display device to off (dark).

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d. The NVS must permit the brightness control to adjust the display brightness over the full controllable range within 10 seconds by a single continuous touch action.

e. The NVS must provide a minimum brightness setting that is no brighter than that needed to maintain readability of the display under normal facility lighting conditions.

f. The NVS must ensure that the minimum brightness setting does not preclude the use of differing brightness or intensity levels within a display to convey status or other information.

g. The NVS must provide dimmer controls for self-illuminated display components.

h. The NVS must ensure that self-illuminated displays do not appear to be illuminated when they are intended to appear extinguished, or extinguished when illuminated

3.5.3.2.5 Display Environments

3.5.3.2.5.1 Tower Cab Displays

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a. Alpha-numeric characters and symbols used on AVN Tower Cab displays must subtend at least 20 – 22 minutes of arc on the retina at a viewing distance of 6 feet.

b. Electronic and electro-optical displays (e.g., LCD, CRT and electrolumenscent displays) for use in the tower environment must provide the minimum contrast specified in Table II of MIL-L-85762A when measured in accordance with test procedures of 4.3.8.2 in a combined environment consisting of 7000 foot-candle diffuse illumination and the specular reflection of a 7000 foot-lambert glare source.

3.5.3.2.5.2 TRACON Displays

a. Alpha-numeric characters and symbols used on AVN TRACON displays must subtend at least 20 – 22 minutes of arc on the retina at a viewing distance of 6 feet.

b. For electronic and electro-optic displays used in the TRACON environment when measured in accordance with test procedures of 4.3.8.2 in a combined environment consisting of 50 footcandle diffuse illumination and the specular reflection of a 10 foot-lambert glare source, the AVN:

c. 1) Must exhibit on-to-background contrast (CL) of a lighted (or active) display image element greater than or equal to 0.6;

d. 2) Must exhibit on-to-off contrast (CI) of a display image element greater than or equal to 0.6;

e. 3) Must exhibit off-to-background contrast (CUl) of an unlighted (or deactivated) display image element less than or equal to 0.25.

3.5.3.2.5.3 En Route Displays

a. Alpha-numeric characters and symbols used on AVN En Route displays must subtend at least 20 – 22 minutes of arc on the retina at a viewing distance of 6 feet.

3.5.3.3 Control-Display Integration

a. The NVS must ensure that the relationship of controls, displays, and visual indicators are in accordance with HF-STD-001, Section 6.3, Visual Indicator-Control Integration.

3.5.3.4 Conventional Human-Computer Interface

a. This section applies to maintenance/supervisory workstations and aspects of the ATC-position interface which are conventional human-computer interfaces.

3.5.3.4.1 General

a. The NVS must ensure that the design of Maintenance/Supervisory Workstations is in accordance with the following sections of HF-STD-001, Chapter 8, Computer-Human Interface as shown in TABLE 3-27.

TABLE 3-27. HF-STD-001, Chapter 8 Applicable Sections

	Section	Title
1	8.1	Screen Design

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	Section	Title
2	8.2	Text Entry and Display
3	8.3	Graphical Information
4	8.6	Coding
5	8.7	Interaction
6	8.8	General Interactive Techniques
7	8.9.1	User-Initiated Interrupts: General
8	8.11	Selection Methods
9	8.13	Controls
10	8.14	Windows
11	8.15.6/7/8/10/11	System Operation

3.5.3.4.2 Specifics

a. Reserved.

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3.5.3.5 Audio Signals and Audio Alarms

a. The NVS must ensure that the design of Audio Signals and Audio Alarms are in accordance with HF-STD-001, Section 7.2, Audio Signals and Audio Alarms.

3.5.3.6 Labeling

3.5.3.6.1 General

b. The NVS must ensure that the design of Audio Signals and Audio Alarms are in accordance with HF-STD-001, Section 4.3.5, Labeling and Marking, and Section 6.1.2, Controls: Labeling and Marking Controls.

3.5.3.6.2 Specifics

a. The NVS must permit labels to be oriented vertically only when they are not critical to personnel safety or performance, and when space is limited.

b. The NVS must ensure that vertically oriented labels are readable from top to bottom.

c. The NVS must ensure that permanent labels are secured to their locations by mechanical fasteners or by an appropriate permanent adhesive so as to remain permanently affixed throughout the service life of the system.

d. The NVS must ensure that temporary labels are placed in label holders for ease of insertion and removal.

e. The NVS must provide shielding to protect temporary labels from grease, grime, moisture, cleaning procedures, and dirt.

f. The NVS must ensure the wording of labels is familiar to intended readers.

g. The NVS must provide the content of all labels to the government for approval.

h. The NVS must avoid the use of abstract symbols (such as individual letters of the alphabet, national characters, or Greek letters).

i. The NVS must avoid the use of abbreviations unless they are standard terminology (e.g., "MHz").

j. The NVS must provide labels that are as concise as possible.

k. The NVS must ensure labels are mounted and protected so as to minimize obstruction by grease, grime, or dirt.

l. The NVS must ensure that permanent labels remain legible throughout the service life of the system.

3.6 Software

3.6.1 Software Categories

a. The NVS must provide a software architecture that allocates NVS functions in three major categories: (a) operating system software, (b) applications software, and (c) support software.

b. The NVS must consider all stored programs executed by a processor or controller, regardless of implementation technique as software.

3.6.1.1 Operating System Software

a. The NVS must employ a standards-based, non-proprietary, operating system(s).

b. The NVS operating system must provide real-time executive(s) for all mission critical functions.

c. The NVS operating system must provide a file management facility.

d. The NVS operating system must provide a file management facility that provides mechanisms for updating file information at the record level.

e. The NVS operating system must provide command file procedures.

f. The NVS operating system must provide command file procedures that include a mechanism for executing files containing procedural sequences of operating system commands and utilities.

3.6.1.1.1 Utilities

a. The NVS utilities must provide system utility libraries that include the data management libraries.

b. The NVS utilities must provide system utility modules that include the data management libraries.

c. The NVS utilities must provide data management libraries that include modules to sort databases on multiple keys.

d. The NVS utilities must provide data management libraries that include modules retrieve data from files based on multiple keys.

e. The NVS utilities must provide data management libraries that include modules to cross reference data in two files based on a single key.

f. The NVS utilities must provide libraries and procedures to support the required RTQC capabilities

g. The NVS utilities must provide system utility libraries that include compilers/assemblers.

h. The NVS utilities must provide system utility modules that include compilers/assemblers.

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i. The NVS utilities must provide compilers/assemblers and a set of commands that are necessary to facilitate compilations and/or assemblies of computer software.

3.6.1.2 Application Software

a. The NVS application software must use standards-based, non-proprietary, software languages.

b. The NVS application software must conform to modular system design standards.

c. The NVS application software must use compile-able source code.

d. The NVS application software must ensure that all of the applications software functions incorporate, software that is unique to their specific objectives.

e. The NVS application software must, except as otherwise specified, ensure that the unique applications software is based on existing, demonstrated technology.

f. The NVS application software must provide application functions that include network management.

g. The NVS application software must provide application functions that include network performance data analysis.

h. The NVS application software must provide application functions that include network security access and protection.

i. The NVS application software must provide application functions that include traffic data analysis.

3.6.1.3 Support Software

a. The NVS must use Network Management Software based on SNMP v2.x.

b. The NVS must provide provisions for upgrade to v3.x or equivalent, without impact to ongoing ATC operations.

c. The NVSMS must utilize a data format compatible with the commercially based MIB network management tools and data structures.

d. The NVS must store the NVS performance database information in tabular or comma delimited, XML files formats for off-line performance analysis.

e. The NVS must provide time stamped event logging capability for validation and verification of the NVS functionality via Operations Administration & Maintenance (OA&M) network access ports.

f. The NVS must include support software that provides a special report which contains hardware diagnostics results.

g. The NVS must include support software that provides a special report which contains test results.

h. The NVS must provide traffic simulation, verification, and reporting support applications.

i. The NVS traffic simulation, verification, and reporting support applications must verify the correct operation of the assets chosen in a loading sharing or BCP operational situation prior to activating the change.

j. The NVS must provide support software that provides a special report which contains RTQC test results.

k. The NVS must provide support software that includes at a minimum reconfiguration support and reporting.

l. The NVS must provide application functions that include network management and reporting.

m. The NVS must provide application functions that include network performance data analysis and reporting.

n. The NVS must provide application functions that include network security access, protection and reporting.

o. The NVS must provide application functions that include traffic data analysis and reporting.

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3.6.2 Software Planning, Design, and Implementation

3.6.2.1 Software Design

a. The NVS software design must accommodate the installation of identical software at each site that adapts to the local resources, environment, and workload.

b. The NVS software design must ensure that local "patches" to executable code and data tables are not used to meet identical software installation requirement.

c. The NVS software design must include error detection.

d. The NVS software design must include fault tolerance.

e. The NVS software design must include recovery from abnormal conditions.

f. The NVS software design must provide logical and physical data independence.

g. The NVS software design must ensure that changes made to the logical structure of the data does not impact the application programs.

h. The NVS software design must ensure that changes made to the physical structure of the data does not impact the application programs.

i. The NVS software design must permit changes to both the form of storage and to the position of the data in the storage medium without impact to the application programs or logical structure of the data.

j. The NVS software design must ensure that the NVS system is initialized to a correct, well defined state upon recovery from a fault and that all processing interrupted by a fault is properly continued after recovery.

k. The NVS software design must incorporate commercially available operating system(s).

l. The NVS software design must ensure all design and development support tools are commercially available.

3.6.2.1.1 Unit Attributes

a. The NVS software design must be functionally and operationally modular to facilitate system expansion.

b. The NVS software design must be functionally and operationally modular to facilitate system modification.

c. The NVS software design must be functionally and operationally modular to facilitate system configuration control.

d. The NVS software design must be functionally and operationally modular to enhance system reliability by facilitating fault detection.

e. The NVS software design must be functionally and operationally modular to enhance system reliability by facilitating diagnosis.

f. The NVS software design must be functionally and operationally modular to enhance system reliability by facilitating, containment.

g. The NVS software design must be functionally and operationally modular to enhance system reliability by facilitating recovery.

h. The NVS software design must be functionally and operationally modular to enhance system reliability by facilitating fault-tolerant behavior.

i. The NVS software design must be functionally and operationally modular to facilitate database changes to the lowest practical level without large program reassemblies.

3.6.2.1.2 Design Representation

a. The NVS software design must be represented in a manner that facilitates traceability to the specification.

b. The NVS software design must be represented in a manner that facilitates ease of design implementation.

c. The NVS software design representation(s) must be maintained as part of the design produce documentation.

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d. The NVS software design representation(s) must use a program design language (PDL) that provide a natural expression of the control constructs specified for code development.

e. The NVS software design representation(s) must use a PDL that is compatible with the properties and facilities of the target language.

f. The NVS software design representation(s) must use a PDL that is compatible with the target language automated tool(s).

g. The NVS software design representation(s) must use a PDL that facilitates a precise specification of the design.

h. The NVS software design representation(s) must use a PDL that imposes a rigorous structure on the design.

i. The NVS software design representation(s) must use a PDL that is directly process-able by the tools specified.

j. The NVS software design representation(s) must use a PDL that is comprised of successive, independent levels of abstraction with an independent set of objects and the operations on these objects defined at each level.

k. The NVS software design representation(s) must use a PDL that explicitly documents design decisions with high-order decisions not affected by low-level implementation.

l. The NVS software design representation(s) must use a PDL that is ensures programmers receive only that information needed to complete a unit.

m. The NVS software design representation(s) must use a PDL that is ensures users receive only that information needed to use a unit.

n. The NVS software design representation(s) must use a PDL that provides formal testable units.

o. The NVS software design representation(s) must use a PDL that provides design decisions decoupled and encapsulated with the testable unit(s).

p. The NVS software design representation(s) must use a PDL that ensures that any interface is explicitly defined.

q. The NVS software design representation(s) must use a PDL that ensures that all unit(s) are completely documented to include any dependencies.

r. The NVS software design representation(s) must use a PDL that permits only procedures within a unit to access the data of that unit.

s. The NVS software design representation(s) must use a PDL that permits access to data by other units through the interface provided by those procedures.

t. The NVS software design representation(s) must use a PDL that allows only functional interfaces to be shared by users and providers, with users seeing only abstract properties.

u. The NVS Integrated Development Environment SW Development Tool product name(s) and revision(s) must be included as part of the NVS SW design representation.

v. The NVS must include Makefile utility and scripts used during the compilation of the source code as part of the Design Representation.

3.6.2.1.3 Special Tools and Techniques

a. The NVS design implementation must use automated design tools to record the NVS software design.

b. The NVS design implementation must use automated design tools to analyze the NVS software design.

c. The NVS design implementation must use automated design tools to maintain the NVS software design.

d. The NVS automated design tools must provide traceability of software components to software requirements.

e. The NVS automated design tools must provide consistency testing of all software units.

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f. The NVS automated design tools must provide the means to verify adherence of the design to software design standards.

g. The NVS automated design tools must provide the means to indicate in the design representation(s) that a design feature is incomplete.

h. The NVS automated design tools must provide the means to identify and track all incomplete design features.

i. The NVS automated design tools must, at a minimum, provide the following printed outputs.

(1) The NVS automated design tools must provide source listings.

(2) The NVS automated design tools must provide error lists.

(3) The NVS automated design tools must provide cross-reference lists.

(4) The NVS automated design tools must provide flow charts.

(5) The NVS automated design tools must provide hierarchy charts.

(6) The NVS automated design tools must provide design changes.

(7) The NVS automated design tools must provide history logs.

j. The NVS software design tools must be applicable throughout the software development life cycle.

k. The NVS software design tools must be applicable throughout the maintenance life cycle.

l. The NVS software design tools must address all aspects of the software design.

(1) The NVS software design tools must address algorithms

(2) The NVS software design tools must address data structures

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(3) The NVS software design tools must address files

(4) The NVS software design tools must address interfaces.

m. The NVS software design tools must be delivered to the FAA.

3.6.2.2 Software Implementation

a. The NVS software must be developed in accordance with programming standards approved by the government.

3.6.2.2.1 Unit Attributes

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a. The NVS must ensure that all source code is indented to clearly denote logical levels of constructs.

b. The NVS must ensure that non-executing statements are grouped and arranged in a meaningful order in the code, e.g., columnar rather than a horizontal string.

c. The NVS must ensure that data declarations are grouped and arranged in a meaningful order in the code, e.g., columnar rather than a horizontal string.

d. The NVS must use meaningful data names and procedure labels.

e. The NVS must ensure that each line of source code contains one statement only.

f. The NVS must ensure that formats for error and diagnostic messages are standardized and require no additional interpretation such as table lookups.

g. The NVS must ensure that loop indexes are not altered during loop execution.

h. The NVS must ensure that unnecessary assignment of a constant value to a variable (especially within a loop) are not be made.

i. The NVS must ensure that units do not share temporary storage locations of variables.

j. The NVS must ensure that complicated expressions, such as compounded negative Boolean expressions, and nesting beyond three levels are avoided.

3.6.2.2.2 Special Tools and Techniques

a. The NVS software design must use automated tools.

b. The NVS automated software development tools must support the use of software configuration management.

c. The NVS automated software development tools must support the use of common data type definitions and procedure libraries.

d. The NVS automated software development tools must support the use of cross-reference listings and indices.

e. The NVS automated software development tools must support the use of reformatted program source text to provide a uniform and consistent style.

f. The NVS automated software development tools must support the use of measurement of program size and complexity.

g. The NVS automated software development tools must support the use of unit interface checking and identification of other program anomalies.

h. The NVS automated software development tools must support the use of unit testing.

i. The NVS automated software development tools must support the use of debugging facilities.

j. The NVS automated software development tools must support the use of data recording and reduction.

k. The NVS automated software development tools must support the use of compilation facilities.

l. The NVS automated software development tools must support the use of linking facilities.

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m. The NVS automated software development tools must support the use of loading facilities.

n. The NVS automated software development tools must support the use of data management.

o. The NVS automated software development tools must support the use of verification of adherence to software programming standards.

p. NVS software development tools must all be delivered to the FAA.

3.6.3 Software Reliability

a. The NVS software must have fault avoidance reliability characteristics.

b. The NVS software must be specified, designed and implemented to achieve high reliability in accordance with the detailed software design and construction requirements presented in 1.1.1.

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c. The NVS software must have fault detection reliability characteristics.

d. The NVS software must detect its own software-induced failures.

e. The NVS software must have fault tolerance reliability characteristics.

f. The NVS software must provide fault-tolerant mechanisms that ensures continued operation of required functions without causing an interruption in service.

g. The NVS software must have fault containment reliability characteristics.

h. The NVS software design must prevent the propagation of software errors.

i. The NVS software design must ensure that no information is passed unless error boundary conditions are satisfied.

j. The NVS must be designed to protect itself against errors in operation that may be introduced as the result of incorrect synchronization of software.

k. The NVS must be designed to protect itself against errors in operation due to data that may be introduced as the result of incorrect synchronization of software.

l. The NVS design must ensure that only explicitly specified information is exchanged among software units (modules).

m. The NVS design must ensure that only explicitly specified information is shared among software units (modules).

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4.0 VERIFICATION REQUIREMENTS

4.1 Responsibilities For Verification

a. Each requirement of the NVS specification must be verified by one or more of the following verification methods as indicated in the Verification Requirements Traceability Matrix in Appendix A.

4.1.1 Verification Methods

a. TEST (T): Verification that is accomplished, with or without instrumentation, through systematic exercising of the application item under appropriate conditions with collection, analysis, and evaluation of quantitative data. Acceptability of the item is determined by the comparison of the data with pre-established quantitative criteria, requirements, and occurrences.

b. DEMONSTRATION (D): Verification that is accomplished by operation, adjustment, or reconfiguration of items performing their designed functions under specific scenarios. The items may be tested and quantitative limits of performance monitored, but only observational data rather than actual performance data are required to be recorded for verification. Demonstration does not require any actions beyond those identified in Test Steps of the Test Procedure.

c. INSPECTION (I): Verification that is accomplished by a visual examination of the item, reviewing descriptive documentation, and comparing the appropriate characteristics with predetermined standards to determine conformance to requirements without the use of laboratory equipment or procedures.

d. ANALYSIS (A): Verification that is accomplished through use of one or more of the following analysis techniques to prove that an item meets specified requirements. Analysis techniques include Mathematical representation such as math models, algorithms, and equations; Charts; Graphs; Circuit diagrams; Data reduction/recording; and Representative Data which may include data collected from previous or other equipment and system verifications

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4.2 Specialized verification requirements

a. All NVS components that connect to common carrier facilities must be registered with the Federal Communications Commission in accordance with Title 47, CFR, part 68, and with Article 800-4 of NFPA-70.

b. All NVS equipment subject to FCC rules and regulations as set forth in 47 CFR part 15 must be tested and certified to those standards.

4.2.1 Test for Sunlight Readability of Display Elements

4.2.1.1 Legend Switches and Indicators

a. The test for sunlight readability of display elements must be carried out in accordance with paragraph 4.8.36 of MIL-S-22885E, subject to the modifications below.

b. The average background luminance B_b must be determined from the arithmetical average of three measurements of luminance taken from different areas on the item under test (selector or display), with the item installed as in a production system, and in a completely de-energized state.

c. The average lit-zone luminance B_{lit} must be determined from the arithmetical average of three measurements of luminance taken from different areas on the transluminated portion(s) of the item under test.

d. The average unlit-zone luminance B_{unlit} must be determined from the arithmetical average of three measurements of luminance taken from different areas on the non-luminated (blocked or opaque) portion(s) of the item under test.

e. The contrast C_{lit} with respect to background of the lit portion of the display must be computed from:

$$C_{lit} = \frac{B_{lit} - B_b}{B_b}$$

f. The contrast C_{unlit} with respect to the background of the unlit portion of the display must be computed from:

$$C_{unlit} = \frac{B_{unlit} - B_b}{B_b}$$

g. Items for which the offeror can produce authentic certification of compliance with MIL-S-22885E for sunlight readability may be excused by the government from further testing.

4.2.1.2 Electronic and Electro-Optical Displays

a. The test for minimum contrast must be in accordance with paragraph 4.8.16.2 of MIL-L-85762A subject to modifications to specular and diffuse lighting conditions given elsewhere in this specification.

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SECTION 5

5.0 ACRONYMS AND ABBREVIATIONS

0TLP	zero transmission level point
A/G	air to ground
AFSS	Automated Flight Service Station
ac	alternating current
ANSI	American National Standards Institute
ATC	air traffic control
ATCT	airport traffic control tower
ATS	administrative telephone system
A/G	Air/Ground
AGC	Automatic Gain Control
A(i)	Inherent Availability
AIO	Office of the Chief Information Officer
AMS	Acquisition Management System
ANSI	American National Standards Institute
ARMS	Airspace Resource Management System
ARTCC	Air Route Traffic Control Centers
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Administrative telephone system
BCP	Business Continuity Planning
BIT	Built-in Test
BITE	Built-in Test Equipment
BITS	Built-in Test Sequences
BUEC	Backup Emergency Communications
CO	Central Office
DA	direct access
CA	Common Answer
CFR	Code of Federal Regulations
CL	On-to-Background Contrast of a Lighted Display Image Element
CODEC	Coder/Decoder
C-RCE	Control RCE
CWP	Controller Working Position
ºC	Degrees Celsius
DAR	Dynamic Asset Reallocation
dB	Decibel
dBa	Decibels Acoustical

dBm	dB above 1 mW
dBm0	dB at TLP
dBrnC	dB above reference noise, C-message weighted
dBrnC0	dB above reference noise, C-message weighted, at 0 TLP
DED	Data Entry Device
DEO	Data entry operation
DoD	Department of Defense
DTMF	Dual Tone Multi–frequency
dBSPL	decibels Sound Pressure Level
dc	direct current
ESD	Electrostatic Discharge
EMI	Electromagnetic Interference
E&M	Ear and Mouth
ERAM	En Route Automation Modernization
ERMS	Environmental Remote Monitoring System
EUROCAE	European Organization for Civil Aviation Equipment
FAA	Federal Aviation Administration
FAT	First Article Test
FCC	Federal Communications Commission
FISMA	Federal Information Security Management Act
FDMI	Flat Display Mounting Interface
FRU	Floor Replaceable Unit
FTI	FAA Telecommunications Infrastructure
FTS	Federal Telecommunications System
GFE	government-furnished equipment
G/G	Ground-to-Ground
GHz	Gigahertz
GMT	Greenwich Mean Time
GoS	Grade of Service
HF	Human Factors
HFDS	Human Factors Design Standard
HS	Headset
HW	Hardware
Hz	Hertz
IA	Indirect Access
IC	Intercomm
IDF	Interemediate Distribution Frame
IP	Internet Protocol
IRD	Interface requirements Document

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ISDN	Integrated Services Digital Network
kHz	kilohertz
LCD	Liquid Crystal Display
LRU	Line Replaceable Unit
LS	Loudspeaker
LTP	Logical to Physical
lb/ft2	pound-force per square foot
MAO	Mute all others MDS Master Demarcation System Frame
MHz	Megahertz
MIC	Microphone
MPS	Maintenance Processing Subsystem
ms	millisecond
msec	millisecond
M/S	Main/Standby
MTBF	Mean time Between Failures
MTBCF	Mean Time Between Critical Failures
MTTR	Mean Time to Repair
mW	milliwatt
NAS	National Airspace System
NE	Network Element
NextGen	Next Generation Air Transportation System
NFPA	National Fire Protection Association Standard
NVS	NAS Voice System
NVSMS	NAS Voice System Management System
OMB	Office of Management and Budget
ORD	Operational Readiness Demonstration
OSHA	Occupational Safety and Health Administration
OVR	Override
PA	Public Address
PABX	Private Automatic Branch Exchange
PAT&E	Production Acceptance Test and Evaluation
PBH	Peak Busy Hour
PBM	Peak Busy Minute
PCB	Polychlorinated Biphenyls
PDL	Program Design Language
PSTN	Public Switched Telephone Network

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Deleted: IVSR Interim Voice Switch Replacement ¶
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Deleted: MAO Mute all others
Deleted: MIC Microphone¶
ms Millisecond¶

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PTT	Push-to Talk
QA	Quality Assurance
RCE	Radio Control Equipment
R-RCE	Remote RCE
RDVS	Rapid Deployment Voice Switch
RI IDF	Radio Interface Intermediate Distribution Frame
rms	Root Mean Square
RTQC	Real Time Quality Control
RX	Receiver
SAT&E	Site Acceptance Test and Evaluation
sec	second
SIP	Session Initiation Protocol
SOW	Statement of Work
SPL	Sound Pressure Level
SS	Single System
STVS	Small Tower Voice Switch
SW	Software
SF	Single Frequency
TED	Touch Entry Display
TEPLL	Talker Echo Path Loudness Loss
TEPDC	Talker Echo Path Delay
TFT&E	Technical Field Testing and Evaluation
TLP	Transmission Level Point
TRACON	Terminal Radar Approach Control
TX	Transmitter
TIA	Telecommunications Industries Association
TIA/EIA	Telecommunications Industry Association / Electronic Industries Association
TL	Transmission Level
UAS	Unmanned Aircraft System
UHF	Ultra High Frequency
VAM	Versatile Alarm Monitoring (VAM)
VDF	NVS Distribution Frame
VDM	Video display Monitor
VESA	Video Electronics Standards Association
VHF	Very High Frequency
VOX	Voice–Operated Switch
VRTM	Verification Requirements Traceability Matrix

Deleted: Device

V	Volts
VA	volt-amperes
VoIP	Voice over Internet Protocol

6.0 GLOSSARY

Action, Continuous Touch - a manual operation at the human/system interface which initializes and uses certain communication circuits and controls that are activated for the duration of the continuous touch action, and deactivated with the cessation of the continuous touch action.

Action, Single Touch - an operation that occurs at the human/system interface which affects communication circuits and controls in one of two ways: (1) momentary-to-make (latch or enable), and (2) momentary-to-break (unlatch or disable).

Activate - to set in motion; cause to function or act. See also "key(ing)".

Active Call or Position Active Call - a call (placed or received) under the control of position operator, and to which they are conversant.

Active Position - an operable controller position functioning with respect to a configuration map.

Active Sector - a sector in which air traffic control is provided in one or more assigned fix posting areas.

Address - a character or group of characters that identifies a register, a specific part of storage, or some other data source or destination, to refer to a device or an item of data by its address.

Advanced Automation System (AAS) - a system of four computer complexes that support air traffic control. The four computer complexes are: Area Control Computer Complex (ACCC) at ARTCC and ACF, Tower Control Computer Complex (TCCC) at Air Traffic Control Tower (ATCT), System Support Computer Complex (SSCC) at FAATC, Research and Development Computer Complex (RDCC) at FAATC.

A_i - a measure of availability from a design perspective. The formula for inherent availability is equal to the calculated mean time between failure (MTBF) divided by the sum of the MTBF plus the mean time to repair (MTTR) or A_i = MTBF/(MTBF+MTTR).

Air Traffic Control (ATC) - refers to the tactical aircraft safety separation service and to organize and expedite the flow of traffic.

Air Traffic Control Position - a common console configured for en route or terminal air traffic control activities.

Air Traffic Controller - a person authorized to provide air traffic service including en route and terminal approach control.

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Air Traffic Management (ATM) - the composite process ensuring the safe, efficient and expeditious movement of aircraft. Air traffic control and traffic flow management are components of the air traffic management process.

Ancillary Position - a common console configured for non-air traffic control activities including: Area Manager, NAS Manager, Area Supervisor, Traffic Management, En Route Metering, Military Operations Specialist, Weather Coordinating, Automation Specialist, Flight Data Communications Specialist, Center Weather Service, Oceanic DAPS, Airborne Warning and Control System, Aircraft Movement Information, and Maintenance.

Any – One, some, every or all without specification or identification.

Archive - a long-term storage area for one or more electronic files in compressed format for more efficient storage and transfer.

Area-Level Reconfiguration - reconfiguration affecting an area's communications and functional capabilities.

Deleted: **Area Control Computer Complex (ACCC) -** that computer complex (hardware and software) of the AAS which provides continuous real-time support of air traffic control of an area assigned to an ACF.¶
Area Control Facility - a building at which en route and terminal air traffic control is provided and supported by an ACCC.¶

Area Map - a correspondence set wherein the communications assignments and control capabilities of an area (predetermined sets of sector suites) within a facility are defined. A correspondence set between the physical maps and configuration maps of grouped sector suites (see Switch Map).

Assembly - a number of parts or subassemblies or any combination thereof joined together to perform a specific function and capable of disassembly.

Assign - a configuration action that provides specific A/G, G/G communication connectivity capabilities and other communication feature capabilities to air traffic control and ancillary positions.

Assigned Frequency - A frequency in an air traffic control position map made available for use at a position. Frequency assignment implies the availability of the transmitter and receiver to the position.

Attended - a condition that exists at an operator position when: 1) a position is active and 2) at least one headset/handset is plugged in at the position HS interface.

Audio Delay - the length of time it takes sounds to traverse a circuit.

Audio Routing - a function that allows for establishment of different output paths through the system for incoming audio. Paths may include routing to operator position loudspeaker(s) or headset / handsets. Audio routing may be accomplished manually or automatically.

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Auditable Event - Identification of events which are significant and relevant to the security of the information system and are deemed to be adequate to support after-the-fact investigations of security incidents.

Authorized access levels - access rights assigned to a user with proper user identifier and password information. Authorized personnel are determined by the access level they are given within the system. This is one of the means by which the Government controls system and information security.

Automatic Audio Routing - a feature that causes incoming A/G audio to an operator position to be routed to the position loudspeaker without operator intervention when a G/G call is in progress and A/G audio routing settings are otherwise selected to route A/G audio to the operator headset. This feature can be manually overridden at an operator position.

Automatic Gain Control (AGC) - an electronic circuit, which automatically increases the volume when someone is speaking quietly and drops it when someone is speaking loudly. The idea is to keep the signal even.

Background Mode - In a multi-program system, the condition under which low-priority programs are executed. The execution of data processing operations that are secondary to real-time voice switching and control.

Background Noise - Noise level present on a connected voice circuit.

Backup - a provision for an alternate means of operation in case the primary means is not available.

Deleted: Provision

Backup AVN – term used when the NVS has two AVNs at a facility for redundancy, which allows for the AVNs to be designated as “Primary” and “Backup”.

BUEC (Backup Emergency Communications) - a secondary backup A/G communications network that is independent of primary A/G communications transmission paths. BUEC is not the same as the backup A/G switch.

Deleted: **Back up -** a provision for an alternate means of operation in case the primary means is not available.¶

Blocking - the inability of a telecommunications system to establish a connection due to the unavailability of paths.

Busy - a condition that exists when a called position has an active call in progress and a full CA queue. A call processing tone that is generated when the above condition exists at a called position (G/G only).

Call - a demand to set up a communication connection.

Call Features - Call forwarding, call monitoring, supervisory recording, headset or loudspeaker call routing, call queuing with caller identifications, etc. Types of calls are made in certain modes with certain features invoked; for example, an interphone (type), indirect access (mode), override (feature) call that is monitored (feature) and recorded (feature) by the calling party's supervisor.

Call Forwarding - a call feature that, when enabled, transfers all subsequent incoming G/G calls from one operator position to another.

Call Forward Chaining - as used in this document, a progressive connection between operator positions established through call forwarding such that calls to the first and successive positions in the chain are routed to the last position in the chain. A call forward chain necessarily involves three or more operator positions.

Call Modes - Direct access, indirect access, and voice call (G/G only).

Call Progress Tones - a tone provided by a telephone switch that informs the calling party of the progress of a call. Common progress tones are dial tone, ringback tone, busy tone, and error tone.

Call Queue/Common Answer (CA) - a switching function whereby certain incoming G/G calls to an operator position are directed to a queue to be selectively answered at the operator position (also known as automatic call parking).

Call Release - the function of ending a G/G call. In addition, the time interval from sending equipment a signal to close down the call to the time a "free condition" appears and the system is ready for another call.

Call Setup - in a telecommunications system the process of establishing a call by creating a connection between stations.

Call Transfer - a call feature that allows a user to redirect a G/G call that has either been answered or that is in the CA queue at a given position to another position.

Call Types - Intercom and interphone (G/G only).

Calling Line Identification or Caller ID - a feature whereby a call source is automatically identified to the called position.

Catastrophic Failure - Failure that is both sudden and complete.

Channel - a communication path providing one-way or two-way transmission between two terminations.

Circuit - (1) A network providing one or more closed paths. (2) An interconnection of electrical/electronic elements. (3) A conductor or system of conductors through which an electrical current is intended to flow (e.g., SS-4 tone burst, DTMF tone burst, dial pulse train).

Classmark - A designator used to describe the service feature privileges, restrictions, and circuit characteristics for lines or trunks that access a switch. Note: Examples of classmarks include precedence level, conference privilege, security level, and zone restriction.

Combined (Positions) - an operator position configuration, which combines the communications resources, including radios and voice circuits, from two or more operator positions.

Commercial Standard - Standard established by a commercial organization or corporate entity governing design, development, documentation, control, manufacture, production, testing, etc., of its commercial and internal products.

Commercial-Off-The-Shelf - is a product or service that has been developed for sale, lease or license to the general public and is currently available at a fair market value.

Common Answer - a switching function whereby certain G/G calls incoming to a position are directed to a queue to be selectively answered by the position user (also known as automatic call parking).

Common Console - a standardized, human-engineered equipment cabinet including a work surface with provision for physical devices including: main display, interactive display, data entry keyboard, keypad, communications jacks, loudspeakers, and panel. Various configurations of physical devices provide for air traffic control and ancillary activities.

Communications Resource - as used in this document, an A/G circuit, G/G voice circuit, operator position or radio.

Complete Failure - Failure resulting from deviations in characteristics beyond specified limits such as to cause complete lack of the function.

Conference Calling - a feature that connects three or more parties together into one G/G call.

Configuration - The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional elements. The functional or physical characteristics (or both) of systems hardware/software.

Configuration Map - a correspondence set between hardware elements and software elements based on their chief functional and physical characteristics in an arrangement that provides communications assignments and capabilities through applications of operational and service classmarks (also see Program Control).

Configuration Plan - a set of assignments of A/G and/or G/G communications resources and control features for an operator position(s) by authorized access levels, which changes the connectivity and functionality at the position(s) upon execution of a configuration plan. A configuration plan is also known as a "map".

Connectivity - An established circuit.

Controller Interface Equipment – equipment at the operator position that includes jack modules, TED(s), speaker(s), and keypad device.

Console - the furniture or portion of an ATC facility that houses operator and/or supervisory and maintenance positions. A console may house multiple positions.

Contention - as used in this document, a condition where two or more operator positions are vying for access to a single communications resource such as a G/G circuit or radio.

Contrast Ratio - The ratio of the maximum to the minimum luminance values in a display device (color or monochrome).

Control Sector - An airspace area of defined horizontal and vertical dimensions for which a controller, or group of controllers, has air traffic control responsibility. Control sectors are established based on predominant traffic flows, altitude strata, and controller workload. Pilot-controller communications during operations within a control sector are normally maintained on discrete frequencies assigned to the control sector.

Controller - See Air Traffic Controller.

Controller Position - a common console configured for en route or terminal approach air traffic control activity.

Corrective Maintenance Time (CMT) - the elapsed time required to restore a system to a specified level of performance.

Critical Failure - a failure that is likely to result in the system or subsystem inability to perform the required functions.

Critical Power Distribution System (CPDS) - that portion of a facility electrical distribution and generation system that provides power to the equipment operating in support of critical air traffic control functions or services.

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Cross-Coupling - a feature wherein the received voice on one frequency in a pair of frequencies is transmitted over the other frequency of that pair without operator intervention.

Crosstalk Index - The probability, expressed in percent, of a system user hearing one or more intelligible crosstalk words during a call. In the Bell System, for the Loop Plant, the recommended performance objective for network planning and equipment design is that a 0.1% crosstalk index not be exceeded for 99% of the loops in the plant.

Cutover - The final change of operation from the present ARTCC communication systems to the AVN.

Demonstrated Technology – non prototype mature operational technology which exists and has existed in the marketplace which known reliability

Database - a collection of data fundamental to the operation of a system or enterprise. Database usually connotes a systematized collection of data that can be immediately accessed and manipulated by a system for a specific purpose. Data Bank describes any collection of data that may or may not be interrelated or immediately accessible by a system.

Database Integrity Verification Application – Is a database integrity verification application to validate compliance with data base development rules.

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Data Entry Device - Device located at the common console which is used to enter data into (e.g., keyboard, mouse, etc.).

dBm - a logarithmic measure of a power with respect to a reference power of milliwatt (one one-thousandth of a Watt). dBm = (10) log (P/0.001 Watt)

dBm0 - a logarithmic measure of power (in dBm) at the Zero Transmission Level Point (0TLP) to produce the same power in dBm at another point in the circuit using a 1.0 KHz tone.

dBmC0 - The test tone 1000 Hz power level measured at the 0TLP using a "C" message weighting network.

dBrn - a logarithmic measure of power with respect to a reference power of one picowatt (-90 dBm), used for noise tests. 0 dBm = 90 dBrn or dBrn = (10) log (P /10^{-12} Watt)

dBrnC - a logarithmic measure of power relative to a noise reference of -90 dBm as measured with a noise meter weighted by a special frequency function called C-Message Weighting. The interfering effect of noise given in dB above a noise reference of -90 dBm at 1.0 KHz measured with a C-message filter.

dBrnC0 - Noise measured in dBrnC and referred to the 0TLP.

Deactivate - to inhibit, block, or disrupt the action of.

Decibel (dB) - a logarithmic measure of the ratio between two powers. dB = (10) log (P_2/P_1)

Degradation Failure - Failure that is both gradual and partial.

Deselect - an action that results in the deactivation of feature or control function.

Deselection - Causing the state of a selected feature of the NVS to change to not selected.

Designator - a name, entitlement, or distinctive mark intended to point out, assign, indicate, or specify.

Diagnostics - conducting a test or series of tests on a device, system, or subsystem to obtain data that will be analyzed to determine the source of a problem.

Direct Access (DA) - a call mode wherein the entire call processing sequence required to establish circuit connectivity is accomplished as the result of a single touch action (G/G only).

Disable - The deactivation of the communication connectivity between the AVN and the RCE as a result of a DESELECT (A/G only). The deactivation of any feature or control function.

Disabled Receiver - a receiver, either main or standby, for a selected frequency at an air traffic control position which the position operator has indicated will not be used for the reception of voice at the position. Disabling a receiver at a position does not affect its enabled or disabled status at any other operational position. Equivalent to locally muting the receiver.

Disabled Transmitter - a transmitter, either main or standby, for a selected frequency at an air traffic control position which the position operator has indicated will not be used for transmission of voice from the position. Disabling a transmitter at a position does not affect its enabled or disabled status at any other operational position.

Display - the visual representation of the output of an electronic device.

Diversity Receiver Site - a remote radio transmitter/receiver that is assigned within the voice switch as part of a multi-site group.

Diversity Receiver Voting - a capability to select signals from multi-site radio frequencies by: a) monitoring and determination of receipt of squelch break also known as “first signal” or b) monitoring and determination of signal quality also known as “best signal”.

Dual Control - a radio implementation wherein two control facilities have access to the same radio at the same remote site. This implementation involves designation of a “primary” and “secondary” control site with the former having priority over the latter.

HS Jack Modules – Two jack module boxes. Each jack module box consists of two inputs with a dual prong interface for each headset or handset.

Electronic Patch Panel - Provides a capability of remote access for the purpose of testing and monitoring individual or grouped voice paths.

E&M - a signaling method for transferring supervisory and control information over a trunk circuit using the signal circuits “E” and “M” leads. The “E” lead transmits into the trunk circuit and the “M” lead transmits into the signal circuit.

Emergency Communication System (ECS) - an air-to-ground communication system having transmitters (TX) and/or receivers (RX), and other ancillary equipment, which is usually remotely located, serving a TRACON.

Emergency Frequency - also known as a “guard” radio, is a specific A/G radio resource including transmitter, receiver or both, at one or more sites providing service over either frequency VHF 121.5 or UHF 243.0 to monitor for, and make, emergency transmissions only.

Emulate – to replace hardware with software to perform the same task for all functions and interfaces.

Enable - The activation of the communication connectivity between the AVN and the RCE as a result of SELECT (A/G only). The activation of any feature or control function.

Enabled Receiver - a receiver, either main or standby, for a selected frequency at an air traffic control position which the position operator has indicated will be used for the reception of voice at the position. Enabling a receiver at a position does not affect its enabled or disabled status at any other operational position.

Enabled Transmitter - a transmitter, either main or standby, for a selected frequency at an air traffic control position which the position operator has indicated will be used for the transmission of voice from the position. Enabling a transmitter at a position does not affects its enabled or disabled status at any other position.

Environmental Remote Monitoring System (ERMS) – a stand-alone remote monitoring system that was designed to be installed at facilities that did not have built-in environmental monitoring capabilities. The NVS provides a pass through, RS-232 connection between the RRN and the AVN.

Erlang - a unit of telephone switch traffic intensity measured in number of arrivals per mean service time. For carried traffic measurements, the number of erlangs is the average number of simultaneous connections observed during a measurement period.

Error - an abnormal operation of software, hardware, or human activity.

Event Log - a time-stamped record of system and position reconfiguration, changes in operational position settings, operational position keystrokes, alert messages, security events, mode and state changes.

Execution Stage – The stage of reconfiguration that invokes a specific command.

External Stations - refers to an operator position on a PBX or a voice switch at another facility.

Facility Backup - The act or process of backing up a failed ACF by expanding the controlled sectors of adjacent ACFs to encompass the control sectors of the failed ACF with respect to navigation, surveillance, control and advisory voice and data communications necessary for continued safe air traffic control

Facility-Level Reconfiguration - a change of communication assignments and control capabilities wherein the modification or changeover occurs with respect to facility maps (also see Facility Backup and Reconfiguration).

Facility Map - a correspondence set wherein the communications assignments and functional capability of an entire facility are defined. A correspondence set between the physical maps and the configuration maps of all sector suites.

Facility Public Address - a government furnished voice page signaling service within the facility.

Fail Soft - If a failure occurs, that failure will not disrupt the entire system. There may be degradation of service, but basic service will continue.

Fail Soft/Fail Safe - a designed property of an item which prevents its failures being critical failures.

Failure - the event, or inoperable state, in which any item or part of an item does not, or would not, perform as previously specified.

Fault - an abnormal operation of hardware or software.

Fault Indication - a visual or audio alert indicating that a fault has occurred.

First Article System - a prototype system upgraded after production award.

First Production System - The initial production equipment.

Fix Posting Area - a volume of airspace, bounded by a series of connected line segments with altitudes, which is assigned to a sector.

Flashing - a visual signal interrupted 60 times per minute with a 50:50 on:off ratio.

Floor Replaceable Unit (FRU) - a LRU that, for functional purposes is located on the operational floor of an ATC facility (e.g., Operator Position equipment inclusive of controller interface equipment) .

Fluttering - a visual signal interrupted 720 times a minute with an 80:20 on:off ratio.

Foot Candle - The illumination on a surface one (1) foot square on which there is a uniformly distributed flux of one (1) lumen.

Foot Lambert - Photometric brightness equal to that of a perfectly diffusing surface emitting or reflecting light at the rate of one (1) lumen per square foot.

Four-Jack Operation - operations supported by two headsets/handset interface devices (e.g. dual-jack modules) at a single operator position in a terminal ATC facility. "Four-jack", or "4-jack", is a colloquial term used in voice switching.

Frequency - a part of the radio spectrum used by the FAA to carry communications between controllers and pilots. The spectrum contains ultra-high (used for military air traffic) and very high frequencies (used for civilian traffic). Frequency is used in this document to identify a particular radio at an operators position.

Frequency Allocation - Designated radio frequency bands for use by specific radio services. Air traffic control frequency allocations used by the FAA are: VHF 118.000 MHz to 135.975 MHz for civilian aircraft; UHF 225.0 MHz to 399.95 MHz for military aircraft.

Frequency Cross Coupling - a feature wherein the received voice on one radio in a pair of radios is transmitted over the other radio in that pair without operator intervention.

Frequency Monitor – a call processing feature that allows a supervisor or a supervisor workstation to listen in on (monitor) the audio of an A/G call.

Frequency Pair - a combination of VHF and UHF frequencies used as a single radio communication channel.

Frequency Status Display – Also known as the "summary page".

Full Image - Pertaining to a disk or tape; a faithful likeness of the subject matter on the original.

Functionality - The characteristics of one or more equipments whose configuration provides the capability to perform specified activities.

Functional Path - The set of physical items/equipments necessary to initiate, sustain, and terminate operation of a given function (e.g., radio, IC, or IP).

Gateway - a term used that describes the function of performing interworking between legacy signaling and VoIP signaling.

Ghost Pilot - an instructor role that simulates a pilot(s) in ATC training exercises. Also the designation for an operator position in the training mode used by an instructor to simulate live air traffic.

Grade of Service (GoS) - The proportion of total calls, usually during the peak busy hour, which cannot be completed immediately or served within a prescribed time.

Gradual Failure - Failure that could be anticipated by prior examination or monitoring.

Ground-to-Ground (G/G) - voice transmissions over IC, IP, or OVR using the voice switch, external networks, or using outside phone lines.

Guard Frequency - a designated point in the radio spectrum to which radio equipment is kept tuned expressly to monitor for and to make emergency broadcasts. The FAA Radio service uses 121.50 MHz and 243.0 MHz as guard frequencies.

Handoff - Turning over air traffic control of an aircraft from a controller of one sector to another controller of an adjacent sector or terminal.

Handoff Function - Turning over control of an aircraft to another controller or facility.

Harmful Tones - tones that exceed the minimum OSHA levels for impulse noise, continuous noise and 8-hour Time Weighted Average (TWA). Impulse noise (very short duration, less than a second) is greater than or equal to 140dB SPL, continuous noise (lasting any duration of seconds, minutes, hours) is greater than or equal to 115dBA SPL, and TWA of greater than or equal to 90dBA.

Hold/Suspend - The capability of suspending a call in progress while placing or answering another call.

Hookflash - momentarily depressing (up to eight tenths of a second) the hookflash button of a telephone instrument can initiate various services such as calling the attendant, conferencing calls, transferring calls and answering a call coming in on a line equipped with call waiting.

Hot Mic - a status of a microphone, headset or handset in which transmission is enabled without the selection of a push-to-talk button.

Human/System Interface - See Man/Machine Interface.

Idle - not being used, but ready or selected (a.k.a. not keyed).

Idle Channel Noise - Noise level present on an unconnected voice circuit.

Indirect Access (IA) - a call mode wherein the call processing sequence required to establish a communication link or to select a control function is accomplished by entering multi-digit numbers on a remote keypad or a keypad on the position touch entry display. The keypad is activated by selecting the IA mode.

Industry Standard - Standard established by authority of a professional, technical, or industrial organization (association, institute, society, etc.) such as ANSI, EIA, or IEEE.

Initial Operational Capability (IOC) - IOC is the declaration by site personnel that the system is ready for conditional operational use in the NAS and denotes the end of Field Familiarization at that site.

In-Service Circuits - Those time-shared circuits of the system which achieve a desired grade of service. The failure of one or several will not make the system inoperative, but may degrade the service during peak load.

Intelligible Crosstalk - The speech signal transferred from one voice channel to another which is sufficiently understandable under pertinent circuit and room noise conditions that meaningful information can be obtained by the disturbed party.

Interactive Display Panel - a display panel that provides access to A/G and G/G communications.

Intercom (IC) - a type of call that provides stations (positions) intra-facility and inter-facility communications.

Interface - a mechanical or electrical link connecting two or more pieces of equipment together.

Intermediate Distribution Frame - a distributing frame used to terminate in-house cabling.

Interphone - Communications between controllers at different facilities utilizing legacy G/G trunks. Refers to NVS operator position-to-legacy analog trunk or legacy analog trunk-to-NVS operator position calls.

Key(ing) - as used in this document, to activate PTT signaling in order to transmit over a selected radio(s). In telephony a switch, or representation of a switch on a touch entry display, that commands a system to set up a communications path.

Key to Lockout - see PTT Lockout.

Keypad – an interface (a group of keys) that allows for a user to input data to a computer or other electronic device. Key functions may be permanently or dynamically assigned to device operations.

Latching - a function that either is or emulates a pushbutton that locks in the down position upon a first touch, and requires a second touch to release the locked condition. The desired activation is in effect for the time the button is in the locked position.

Latency - is a time delay between the moment an audio transmission is initiated, and the moment one of its effects begins or becomes detectable.

Legacy - an FAA system that is currently in operation in the NAS.

Legal Recorder(s) - a system used in ATC facilities to record, store, archive, retrieve, playback, delete, and manage records of A/G and G/G voice communications between air traffic controllers and pilots and between air traffic controllers located at different facilities. Legal recorders are properly referred to as facility voice recorders.

Line - a family of equipment and devices designed to provide users with access to a choice of communication services and features. A physical channel between the position equipment and G/G and the main frame.

Line Circuit - The circuitry required to terminate, convert, and provide transmission, supervisory and control signals at the position side of the interconnection networks, and at the position and/or equipment end instruments. This circuitry can be divided between actual network terminations and position equipment terminations. This includes all circuitry that interfaces the position with the interconnection networks and the common control.

Line Replaceable Unit (LRU) - Any system item that is replaceable at the organizational maintenance level without using any special tools level to restore the operation after a failure. Also known as Lowest Replaceable Unit.

Local Muting - a capability to suspend receipt of audio at a position from a given radio.

Local Preemption - an assignable capability that provides priority access to a given radio that allows that radio to be seized by a designated operator position within the voice switch by PTT. PTT by an operator position with preemption rights will lock out all other attempted users including the user just prior to PTT activation.

Local Radio - as used in this document, a radio that can be accessed from operator positions at one facility without the need to connect through a voice switching system at a second facility.

Lockout - The inability of one or more users to initiate voice transmission on a given circuit because that circuit is already enabled or in use (see Push-to-Talk).

Logical Position - a logical position is an assignment of communications resources to support a specific operation within an ATC facility that is not by itself directly connected to a physical operator position. An example might be "Local East" or "Sector 21".

Logical Position Identifier - An alphanumeric string of 2 to 4 characters for ATC positions and up to 6 characters for other positions types which is used within the configuration maps to represent a logical position's primary function (e.g., "R44" = Radar controller, Sector 44). The Logical Position Identifier mapped (assigned) to a physical console identifier permits the physical location of a logical position to be uniquely determined.

Logical Map - Map that defines position identification for communications connectivity independent of the position's physical address.

Loop-Back Testing - a standard telephone test procedure involving accessing the circuit at any test access point and sending test signals down the line. The test signals are returned (looped back) to the test access point where diagnostics are then performed on the returned test signals. The loop-back points are located progressively further away from the test access point until either the fault has been detected or the entire circuit has been tested.

Loop Closure - a communications path that joins an originating position back to itself through one or more operator positions.

Main Distribution Frame - a distributing frame used to terminate leased and Government-owned long-line facilities on the one side and cable pairs for line and trunk equipment terminals associated with a switching system on the other side. The main distribution frame is the interface point used for associating any outside line or trunk with any desired equipment terminal or with any other outside line or trunk. It usually serves as a test point between in-house and outside plant cabling.

Main (or Standby Units) - Units that are operationally critical and are redundantly integrated into the system to achieve a high degree of reliability.

Maintenance Data Terminal (MDT) - an external device that can interface to and access the RMMS via a NAS managed subsystem or RMMS processor.

Maintenance Log - a time-stamped record of system health, LRU configuration, fault indications, failure history, and diagnostic results.

Maintenance Position - A common console area configured to allow activities specific to performing maintenance activities (e.g., test point access, duplicate operator position equipment, duplicate workstation equipment, printer equipment, indicators, power supply monitoring and service points, etc.). (also see Ancillary Position).

Man/Machine Interface - (Pertaining to station control and data acquisition). The operator contact with equipment governed by ANSI IEEE C37. MIL-STD-1472 is recommended as a reference for use in the design and evaluation of the man/machine interface.

Manual Ring - a selective signaling arrangement that consists of a manual ring (re-ring), generated by the calling party, to alert a specific station on a multidrop circuit in which all stations receive the ringing signal.

Map - To establish a correspondence between the elements of one set and the elements of another set. A correspondence set between elements of one set and elements of another.

Master Instructor - a position, determined by access authorization that controls those portions of the system that perform training functions.

Maximum Corrective Maintenance Time - that value of maintenance downtime within which a specified percent of all maintenance actions must be completed.

Mean Talker Level - Specified at -13.9 dBm0, which is 0.9 dBm less than the maximum voice frequency (VF) signal (average more than 3 seconds) on a standard VF channel and 2.1 dBm more than the VF channel interface standard.

Mean Time Between Failure (MTBF) - a basic measure of reliability for items: the mean number of hours during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Mean Time to Repair (MTTR) - a basic measure of maintainability. The formula is equal to the sum of Corrective Maintenance Times (CMT) divided by the total number of failures for a system. MTTR is also a measure of direct labor to correct unscheduled system or equipment outages. It excludes logistics and administrative time (e.g. travel time, time waiting for spare parts or test equipment, record keeping time).

Meet-Me Conference - a conference call in which parties desiring to enter a (pre-arranged) conference call do so by individually accessing the conference feature (e.g., a conference bridge).

Mode - a possible, customary, or preferred way of doing something.

Modular - The extent to which hardware/software is composed of discrete components such that a change to one component has minimal impact on other components.

Module - a limited aggregate of LRUs, data, and contiguous codes that performs independent functions. Typically, modules are used repeatedly in the construction of the system.

Monitor - To listen in on the communications of another controller.

Multiple - Providing more than one connection at a common point.

Multi-point Trunk - a dedicated trunk shared by three or more positions at two or more facilities.

Multifactor Authentication - sometimes called strong authentication, which is an extension of two-factor authentication. This is the Defense in depth approach of "Security In Layers" applied to authentication. While two-factor authentication only involves exactly two factors, multi-factor authentication involves two or more factors. Thus, every two-factor authentication is a multi-factor authentication, but not vice versa.

Multi-position Sector - a sector whose control involves the use of more than one common console; typically, it will use two or three adjacent consoles.

Multi-site Group/Grouping - the capability to access multiple remote transmitter/receiver sites for a single radio frequency through multiple radio interfaces.

Muting - The capability to eliminate receiver output volume on selected air/ground channels.

Muting, Local - See Local Muting.

Muting, Remote - See Remote Muting.

Network Call – a VoIP call over any Ethernet protocol.

Network Element (NE) - is hardware equipment that is addressable and manageable. NEs provide support or services to the user and can be managed through an element manager.

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Network Interface – the Internet Protocol (IP) interface to the Government Provided Transport System.

Non-Blocking - a capability of the network such that the total number of available transmission paths is equal to the number of ports. Therefore, all ports can have simultaneous access through the network.

Non-Developmental-Item (NDI) - is an item that has been previously developed for use by federal, state, local, or a foreign government and for which no further development is required.

Non-Latching - a feature which either is or emulates a pushbutton that requires an operator to provide continuous touch action to maintain the desired pushbutton activation. The activation is terminated by the release of touch action on the pushbutton.

NVS Console Equipment - The complement of NVS position equipment consisting of the NVS position equipment consisting of the NVS position electronics box, the indirect access keypad and interactive display unit(s) (panel(s)).

NVS Interactive Display Panel - a physical device that provides display and control access to the user.

OA&M Port - is defined as an Ethernet Port on each NVS equipment component connected to an OA&M LAN used strictly for configuration, administration, and operations on the NVS equipment in question. Payload data is not transmitted via this virtual LAN/WAN.

Off-Hook - One of several line/trunk supervisory signals. Normally a line/trunk state change of idle-to-off indicates a request for service.

Off-Line - an equipment condition wherein equipment is operating independently, or is disconnected from, the primary system and not available for ATC use.

Off/Out of Service State - a state in which equipment is not available to perform communications functions.

On-Line - (1) An operating condition wherein input data enters the system directly from the point of origin or in which output data is transmitted directly to where it is used. (2) The operations of a functional unit that are under continuous control of a central or main processing unit.

On/In Service State - a state in which the system or equipment is under power, is available to perform communications functions, and is not undergoing maintenance.

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Open Format - a published specification for storing digital data, usually maintained by a non-proprietary standards organization, and free of legal restrictions on use.

Open Source - source code of software that is made available with either relaxed or non-existent intellectual property restrictions.

Operating Position - a manned active position.

Operational Capability Assessment (OCA) - an assessment of a prospective contractor-developed technical solution conducted by the Government during source evaluation to determine how the prospective solution would meet requirements in a Screening Information Request. An OCA may involve limited operation by the Government of the contractor system.

Operational Capability Demonstration (OCD) - a presentation prepared and presented by a prospective contractor to the Government during source evaluation during which a prototype or production version of a product is demonstrated.

Operational Configuration - Hardware, communications, functional assignments, and connectivity currently in effect.

Operational Communications Resource - an A/G or G/G circuit supporting ATC operations.

Operational Suitability - the capabilities of a system to support all operational tasks including support of all problem solving and decision making tasks of the user. Operational Suitability refers to the appropriateness of the functionality and the effectiveness of the system to support situation awareness and information, error, and workload management.

Operational Position - a manned position defined within a configuration.

Operator Position – provides the human interface between an Air Traffic Controller and NVS capabilities and functions.

Outgoing Supervision Signal – A communication line that is used to carry the transmit control signal (e.g., M-lead).

Outlier - Data point which is not typical of the rest of the data; it may lie three or four standard deviations or further from the mean of the sample.

Outpulsing - Pulsing from a sender.

Overlapping – To coincide in part with; have in common with.

Override (OVR) - a call feature whereby a call being placed results in connection to the called party, even if the called position has an active call in progress.

Override Call Chaining – a situation were party A overrides party B who is overriding party C, etc.

Private Automatic Branch Exchange (PABX) - a private automatic telephone switching system that provides for transmission of calls to and from the public switch telephone network, and private switched or dedicated telephone networks.

Paired Frequency/Radios –two positions that are matched for use together on one frequency.

Page - a page is that portion of a display that provides the capability for the operator to view output from the system and to access controls where the display provides that capability using a single screen.

Parallel Jack Operation - operations supported by two headsets/handset interface devices (e.g. dual-jack modules) at a single operator position in an en route ATC facility. Parallel jack operation supports split position operations.

Partial Failure - Failure resulting from deviation in characteristics beyond specified limits, but not such as to cause complete lack of the required function.

Party - a person or group of persons who participate in a G/G call or conference; the person under consideration.

Peak Busy Hour (PBH) - a value for the most traffic, in call attempts, during a single hour.

Peak Busy Minute (PBM) - a value for the most traffic, in call attempts, during a single minute.

Peripheral Equipment - subassemblies or devices provided by subcontractors or vendors to perform a specific function. Examples may include uninterruptible power supplies and fiber optic communications equipment.

Performance-Based Airspace - regulatory definition of performance requirements in airspace.

Physical Console - a specific physical device and/or workstation which includes a set of console equipment. Examples include an M-1 console, a common console, and the supervisory workstation. Each physical console has a unique physical console identifier.

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Physical Console Assignment Mapping - a correspondence of logical console identifiers to physical console identifiers. The correspondence is such that only one physical console identifier is associated with a logical console identifier.

Physical Console Identifier - An alphanumeric string of up to 8 characters which uniquely identifies a specific physical console. Each physical console has a unique console identifier. From its physical console identifier, the precise location of a physical console can be determined.

Physical Map - a correspondence set of the functional and physical characteristics of hardware.

Plenum Rated - a type of cabling that is fire retardant and approved for use in air returns.

Position - a location or piece of equipment at which a person works, e.g., that portion of a sector suite that is normally provided for the use of one ATC person

Position Equipment - The position equipment consists of all equipment mounted in the console as well as the associated position logic, including its power supply (also see Common Console).

Position-Level Reconfiguration - a change of assignments and control capabilities wherein the modification or changeover occurs with respect to position maps.

Position Map - a correspondence set wherein the communications assignments and functional capabilities of a single position are defined. A correspondence set between the physical map and a configuration map for a single position (also see Switch Map).

Position Roll-In - Combining of communications assignments and functional capabilities required to control a sector at one or more positions of a sector suite.

Position Roll-Out - Distributing communications assignments and functional capabilities required to control a sector among positions of a sector suite.

Position Voice-Monitoring – a function of the supervisor workstation which participates in the monitor contention process.

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Preempt - (1) The disconnection and subsequent reuse of part or all of an established connection of lower priority origins by a higher priority source. (2) Jack module preemption is disconnection and subsequent reuse of all the pre-established connections at a position. (3) PTT preemption by frequency classmark is disconnection and subsequent reuse of part of the established connection(s) for use of the frequency.

Preemption Capability - Ability to take over all existing communications channels.

Preset Conference - a preset conference is a type of conference call in which three or more parties are automatically dialed upon initiation of the conference.

Primary AVN – term used when the NVS has two AVNs at a facility for redundancy, which allows for the AVNs to be designated as "Primary" and "Backup".

Primary Communications Mode - the principal configuration for A/G and G/G communications using the NVS.

Primary Radio - a radio that includes main and standby transmitters or receivers used as an ATCS first means of A/G communication when a backup radio such as BUEC is available.

Private - a communications circuit that prohibits monitoring by others.

Program Control - The interaction between the software and the hardware of the switching system which determines the time and sequence in which processing occurs. The relationship between a set of instructions and the electronics incorporated into the design of the switching system which enables that system to recognize and perform tasks by interactive user commands or without further intervention by a system user.

Progressive Conference - a conference call in which conferees are successively added to the conference, up to the conference limit, at the discretion of a calling party.

Prototype System - a pre-production model.

Pushbutton Action or Pushbutton Operation - The selection of an operation, function, or process by pressing or touching a function key or some display group representing a function key. Pushbutton operation, although in existing equipment refers to the operation of a mechanical switch, has a broader meaning to include such state-of-the-art controls as touch membrane, capacitance touch, touch-entry standards and to meet the reliability maintainability requirements of this document.

Push-to-Talk (PTT) - a method of communication over a speech channel in which transmission occurs in only one direction at a time; while talking the talker is required to keep a switch activated (continuous touch action).

PTT Device - as used in this document, a peripheral device such as a headset, handset, hand microphone or footswitch that provides PTT signaling.

PTT Confirmation – indicates transmitter keying.

PTT Lockout - Condition arising when an attempt is made to transmit on a frequency that is already being used. Transmission will not be permitted to the attempting position.

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PTT Preemption - a classmarked capability for a frequency at a position whereby PTT activation from that position will cause seizing of the frequency, locking out all other attempted users including the user just previous to PTT (preemption) activation.

PTT Trunk Lockout - Condition arising when an attempt is made to transmit on a trunk that is already being used. Transmission will not be permitted to the attempting position.

Pulsing - The signaling over the communication path of signals representing one or more address digits required to set up a call.

Radio - as used in this document, a specific A/G radio resource including transmitter, receiver, or both, providing service over a given frequency at a given site.

Radio Control - a generic term for any equipment providing access to remote Receivers and Transmitters.

Radio Control Equipment – refers to the type of legacy control and remote radio control equipment used to receive and transmit the radio functions.

Radio Transfer (R/T) - radio transfer switch functionality that routes all A/G audio to the position loudspeaker.

Real Time - the actual time during which a process or event takes place. Real time processing indicates that data is processed by a system as soon as it is entered.

Real Time Quality Control (RTQC) - Real time quality control is the on-line capability of fault detection, isolation, and reporting in real time.

Receiver - Equipment that picks up radio signals sent by transmitters.

Reconfiguration - a change of communication assignments and control capabilities through the modification of the invoked configuration map or through a changeover from one map to another. Reconfiguration can take place at the position, sector, area, and facility levels.

Recovery - restoration or return to proper operation.

Redial - a call function that dials the number of the previous call placed.

Release - the process of ending a G/G call.

Relief Briefing - a verbal communication exchange between ATCS during the process of transferring air traffic control position responsibility.

Remote Access - (1) inter-network communications (NAS/Non-NAS) or (2) external WAN communications (Non-FAA) into internal FAA networking environments.

Remote Override - the capability to provide override between two independent systems, to/from TCS.

Remote Muting - an A/G capability, typically at an operator position, to suspend receipt of audio from radio interfaces that are so equipped, such that audio is muted from the radio receiver.

Remote Preemption – remotely inhibiting of a service so another service may be provided that has a higher priority level.

Remote Radio - a radio that can be accessed from operator positions at one facility by connecting through a voice switching system at a second facility.

Resectorization - redefining and restructuring sectors and the creation of new sectors to support the establishment of new airways and changing traffic patterns.

Resource – a resource is a device (e.g., A/G radio) or service (e.g., G/G circuit) that can be used or assigned. Resources include transmission lines, switching systems, data processing devices, security processes, or transmission capacity.

Return Loss - the return loss at an impedance discontinuity on a two-wire line is the ratio, expressed in decibels, of the level of incident signal to that of its reflected signal. The return loss on a four-wire line is the insertion loss measured between transit and receive pairs with the far end terminated as specified. Echo return loss is a weighted average (on a power basis) of the return loss at all frequencies in the range 500 to 2500 Hz. Single-frequency return loss is the lowest non-weighted return loss in the 0.2 to 3.2 KHz band.

Reverted - to return to a former condition.

Ringback - a tone that indicates to a caller that a ringing signal is being applied to a called station.

Screen - the portion of a terminal or monitor upon which information and controls are displayed.

Sector - a volume of airspace, bounded by a series of connected line segments with altitudes defined for the purpose of assigning responsibility for control of aircraft in the airspace (also see Control Sector).

Sector Roll-In – Moving one of the radio transmission portions of a sectorized cell site from one logical division of storage disk's tracks into another.

Sector Roll-Out – Moving one of the radio transmission portions of a sectorized cell site from one logical division of storage disk's tracks out of another.

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Sector Airspace - One or more contiguous fix posting areas (FPAs) controlled from a single control sector (i.e., the FPAs assigned to a control sector). The sector airspace may overlie or underlie airspace controlled by another sector.

Sector Area - See Sector Airspace.

Sector Combining - Combining of more than one sector's communications assignments and functional capabilities at one or more sector suites.

Sector Decombining - Distributing of combined sector communications assignments and functional capabilities among sector suites.

Sector-Level Reconfiguration - a change of ATC communications assignments and control capabilities wherein the modification or changeover occurs with respect to sector maps.

Sector Map - a correspondence set wherein the communications assignments and functional capabilities of all positions in a sector suite are defined. A correspondence set between the physical maps and the configuration maps of all positions in a sector suite (also see Switch Map).

Sector Suite - a collocated set of one to five common consoles equipped with appropriate sets of data entry and display devices. The set is assigned to one or more controllers working a control sector.

Sector Suite Common Console - Physically identical position workstations within a sector suite which contain the common console equipment as a primary component.

Secure State - a condition in which a system is protected from the activities of unauthorized access and the unauthorized activities of trusted agents.

Select - An action at an ATC or ancillary position touch entry display or interactive display which results in the activation of an A/G communication connectivity at that position.

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Select to Lockout - the prevention of consecutive users from transmitting on the same radio at the same site. This is based on a first-come-first-serve approach, where the first user to select the frequency controls the transmitter is allowed to transmit. Other users are prevented from transmitting on the same frequency until the first deselects the transmitter.

Selected Frequency - One of an air traffic controller's assigned frequencies which the position operator has indicated will be included in the set of currently operational frequencies to be used for transmission and reception at the position. Connectivity of the transmitter and receiver has been confirmed.

Selective Mode Operation - In this mode, a VHF frequency and UHF frequency assigned to a sector are combined on one trunk. The controller may select VHF only, UHF only, or select both frequencies simultaneously. Using this system, a controller keying one frequency (VHF or UHF) denies the other frequency (UHF or VHF, respectively) to another controller.

Selective Mode Transmitter Tracking – See Radio Classmark.

Selective Signaling (SS) – a network control process in which signaling information relating to a multiplicity of circuits (trunks), is conveyed over a separate single channel by addressed messages. Selective signaling system #7 ("SS7") is the primary system used for interconnection of telephone systems. SS7 sends packets of control information between switching systems.

Selector – a device that is used to select a number of signals to the input of another device.

Sender - Equipment that generates and transmits signals in response to information received from another part of the system.

Service Circuits - Those time-shared circuits of the system which achieve a desired grade of service. The failure of one or several will not make the system inoperative, but may degrade the service during peak load.

Service F - a communications service comprised of dedicated circuits leased by the FAA.

Sidetone - The acoustic signal resulting from a portion of the transmitted signal being coupled to the receiver. a function that allows an operator to hear their voice while they are speaking.

Simultaneously - occurring or operating at the same time; concurrently.

Single Point Failure - a failure of a single item which has the effect of failing an entire function or functionality. The Backup AVN is excluded from being used to prevent a Single Point Failure of an AVN.

Signaling - With respect to telephone switching systems; the transmission of address and other switching information between stations and central offices, stations and switching entities, and between switching entities.

Site - Any location where equipment is to be supplied or installed.

Site-Specific - pertaining to something that is confined to, or valid for, a particular facility.

Sound Pressure Level (SPL) - An acoustical intensity expressed in decibels above a reference level of 0.0002 dynes/square cm.

Specialist - an operator or maintainer of a system. Examples include Air Traffic Control Specialist (ATCS), a traffic management specialist, or an Airway Transportation System Specialist (ATSS). Also referred to as users.

Speed Dial - the ability to recall and apply a prerecorded sequence of digital entries. This must include, but not be limited to, alphanumeric entries. It may include other information, such as, line selection, etc.

Split Mode Operation - The VHF and UHF frequencies of the sector are carried on two different trunks. Thus, there is no contention; PTT lockout affects only the selected frequency.

Squelch Break - a circuit function that acts to suppress the audio output of a receiver in the absence of a sufficiently strong input signal**.**

Staffed Virtual Tower (SVT) - an operational concept that allows air traffic service provider personnel to service multiple airfields from a single physical location. The ability to use SVTs enables airports to receive tower services that would not normally, given the criteria of today and the costs of building a tower.

Standard - Regularly and widely used, available, or supplied; definite rule for measurement of quantity, weight, extent, value, or quality as established by authority.

Standards-based - ISO or ANSI standardized software language including but not limited to C, C++, C#. The standards elements consist of the core language and standard libraries of functions are used to develop application code

Standard Telephone Keypad - a touchtone dial pad on a pushbutton phone consisting of 12 buttons with digits from 0 through 9, asterisk/star symbol, and a pound/number symbol. Example is Dual Tone Multifunction (DTMF).

Subassembly - Two or more parts that form a portion of an assembly or a unit replaceable as a whole, but having part or parts that are individually replaceable.

Subsystem - a combination of sets, groups, etc., that performs an operational function within a system and is a major subdivision of the system.

Sudden Failure - Failure that could not be anticipated by prior examination or monitoring.

Supervisory Position - The workstation for first line supervisor who is typically responsible for less than eight sector suites (also see Ancillary Position).

Supervisory Signaling - Supervisory signals are signals used to indicate or control the states of circuits involved in a particular switched connection. A supervisory signal indicates to equipment, to an operator, or to a user that a particular state in the call has been reached and may simplify the need for action.

Support Position - The workstation for personnel supporting air traffic control (also see Ancillary Position).

Suspend - to cause to cease or bring to a stop or stay for a period of time.

Switch Map - That portion of a position, sector, area, and facility map that provides the correspondence between the logical connectivities and the physical connectivities within a configuration.

System - The equipment, hardware/software or subsets of two that fulfill the functional requirements of this document.

System-Wide - this term refers to a requirement that is applied throughout a single NVS system. System-wide settings are also referred to as facility settings.

Support Functions - All functions not listed in Table IX, 3.2.3.1, are support functions for availability considerations.

System-Generated A/G PTT - An A/G PTT signal initiated by the system to support cross-coupling, weather broadcast, and emergency frequency broadcast.

Tactical Special Use Frequency - Each area is assigned one UHF frequency allowing military planes (typically high-performance planes) to change their communication frequency only upon entering a new area as opposed to a new sector.

Telecommunications - communicating over a distance by telephone and radio including the transmission, reception, and switching of signals.

Telephone Position Circuit - All circuitry required to permit the telephone instrument or headset to access all voice transmission paths terminating at the position.

Temporary Modifications - changes to assignments and access-controlled configurable functions limited to configuration maps at a single operator position, or a set of operator positions less than the entire system, executed by authorized access levels.

Toll Quality - the audio transmission at the quality level of an ordinary long distance telephone call. Toll quality is measured using the PCM64 standard or ITU-T P.800 standard, which utilizes mean opinion scoring of four or five points out of five, points possible.

Tone Notching – function that performs the removal of any tones in the receive audio at the operator position.

Traffic Log - a time-stamped record of A/G and G/G call traffic, call status, switch loading, voting per radio.

Training Mode - an operation mode in which an operational position supports training with the same voice communication assets as the primary mode but without affecting live air traffic.

Transceiver – a transceiver is combination of a radio transmitter and receiver into one radio device or assembly.

Transmission Level Point - a signal-measuring point, defined during the transmission system design, where a signal level is specified in relative, but not absolute, terms. 0TLP refers to the zero transmission level point which, in contemporary design practices, is an arbitrary reference along a transmission path. The transmission level at any other point is the nominal design gain (or loss) in decibels relative to zero transmission level at 1.0 KHz. The 0TLP will be defined by the contractor; the zero transmission level is specified as 0 dBm at 1.0 KHz.

Transmitter - Equipment that sends radio signals to a connected antenna.

Trunk - a communication channel between two switching systems. A two-wire or four-wire circuit that can be a leased or a Government-owned transmission facility connecting the AVN with external or remote equipment. The trunk will normally include the protection and isolation equipment when leased facilities are used. A trunk is switch-connected at both ends.

Trunk Circuit - The circuitry being controlled by the AVN to directly connect with another switching system.

Trunk Group - a number of trunks that can be used interchangeably between two or more switching systems.

Trunk Multi-Point - a dedicated trunk that is shared by three or more positions, at two or more facilities.

Turnkey - Complete single responsibility from start to the point of turning over the final system, ready for operational use.

Type - a particular kind, class, or group.

Type Test - Tests performed to verify that the equipment or system performs over the range of specified service conditions.

Unattended - a position condition that exists when a headset/handset is not connected at an operator position.

Unit - An assembly or any combination of parts, subassemblies, and assemblies mounted together, normally capable of independent operation in a variety of situations.

Unmonitored - a radio that is assigned but for which the RX has been deselected at all positions having the assignment.

Unwanted Tones - spurious audio at levels potentially damaging to human hearing according to 29 CFR 1910.95.

Usability (Ease of Use) - the perceptual and physical characteristics of the human-system interface; includes general issues regarding the ability of users to operate the system as well as to read, detect, access, and manipulates information.

User(s) - the Air Traffic Control Specialist, Airway Transportation System Specialist, supervisor, traffic management specialist, flight data specialist or other personnel who operate or maintain the NVS equipment.

User Interface - hardware, software, and human activity that defines the interaction between a participant and computer system making one compatible with the other.

Utility Program - a computer program in general support of the processes, of computer, e.g., loading, sorting, trace routines, or copying data from one storage device to another.

Versatile Alarm Monitoring (VAM) - provides user defined alarm monitoring wherever RCE equipment is located. The RCE hardware includes many spare discrete inputs/outputs, which can be used to monitor other systems, environmental sensors, etc. The user can also include internal RCE signals in an alarm, such as trunk status or test tone generation. The RCE can alert workstation users when user-defined thresholds have been exceeded, and also generate discrete, mappable outputs.

Virtual Circuit (VC) - a connection-oriented network service which is implemented on top of a network which may be either connection-oriented or connectionless (packet switching).

Virtual Connection - 1. (VC) A connection or a path through an ATM network. The word "virtual" indicates that the connection is logical rather than physical. Nothing to do with a virtual circuit on a packet switching network. 2. A communications link (also sometimes referred to as virtual circuit) that appears to be a direct connection between sender and receiver, although physically the link can be routed through a more circuitous path, running over virtual circuits instead of a private network built primarily with dedicated lines. A virtual connection can provide full-time connection among many sites, including those configured for SNA/SDLC protocol. A virtual connection can handle any transmission protocol and is supported worldwide. It can provide high throughput and low delay for LAN and Internet applications, peer-to-peer connectivity, client-server computing, and other distributed processing applications.

Voice Call - a call mode wherein initial circuit connectivity is always to the loudspeaker at the called position. Prior to answering, the called party must switch the connection (single touch action) to his or her headset. Voice calling is an overlay mode, that is, it can be used in conjunction with direct access or indirect access modes. Also known as group alerting.

Voice Call Circuit - a special connectivity path for processing voice calls to selected loudspeakers.

Voting Algorithm –Software that can detect and select the strongest or best radio signal possible from a group of radio receivers operating in the system.

VOX - any interfaces to control voice connectivity based upon the magnitude of audio-frequency energy in the transmitted signal (e.g., voice call).

WINKING - a visual signal interrupted 60 times per minute with a 95:5 on:off ratio.

Workstation - a personal computer (PC) to perform supervisory and maintenance functions.

Zip Tone - a 0.2 second burst of dial tone.

APPENDIX A: VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

This appendix defines verification requirements for the NVS. A more detailed description of this VRTM can be found in section 4, Verification Requirements, of this specification.

Verification methods are listed in the VRTM as Inspection (I), Analysis (A), Test (T), or Demonstration (D). An (X) in the verification requirements traceability matrix (VRTM) indicates that the government has discretion on whether to conduct verification of that requirement during the identified phase. A dash (—) indicates that the item is not anticipated as a test verification requirement.

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for each NVS functional path.

Position-Level Availability

The AVN must provide position-level inherent availability based on the (critical and non-critical) functions to be performed at the position.

The AVN must ensure that all failures of A/G communications or OVR calls, delineated as critical failures in TABLE 3-16, do not exceed 200% of the specified throughput timing in the 99.99 percentile column of TABLE 3-16.

The AVN must ensure that all non-critical position functional failures do not exceed 500% of the specified throughput timing in the 99.99 percentile column of TABLE 3-16 or one second, whichever is greater.

The AVN must ensure that all position failures other than A/G communication or OVR calls, delineated as non-critical failures in TABLE 3-16, do not exceed 500% of the specified throughput timing in the 99.99 percentile column of TABLE 3-16 or one second, whichever is greater.

The AVN must use forty-eight (48) frequencies and one OVR call for the critical communication availability model.

The AVN must exhibit position-level function availabilities specified in TABLE 3-16.

TABLE 3-16. Position-Level Availability Requirements

Function	A(i)
Critical Communications	0.9999
Non-Critical Communications	0.9995

System-Level Availability

The NVS must determine the system level availability by the number of positions whose critical functions are operationally available.

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Contradicts Time to Repair section

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<u>Support Function Availability</u>

The NVS must, for support functions, meet an availability of A(i) = 0.999 with an MTTR of 1 hour, [JC1]maximum.